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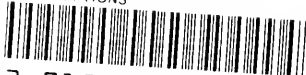
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RUDDIMAN # INCOMPATIBILITIES IN  
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# INCOMPATIBILITIES

IN

## PRESCRIPTIONS.

FOR

*STUDENTS IN PHARMACY AND MEDICINE  
AND PRACTICING PHARMACISTS  
AND PHYSICIANS.*

BY

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*Professor of Pharmacy and Materia Medica in  
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*SECOND EDITION, REWRITTEN.*

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## PREFACE TO THE SECOND EDITION.

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IN this edition Part I has been entirely rewritten. Many of the statements made in the first edition have been gone over in the Author's laboratory; a few were found to be incorrect, while a modification of others was necessary. In performing the laboratory work the fact was again emphasized that many conditions, such as temperature, dilution, order of mixing, impurities in commercial drugs, etc., materially affect the results obtained. The text of this part of the book has been made rather full so that as a reference book it may have some value. At the same time the insertion of numbers at the beginning of the statements makes it easy for the teacher using the book to designate what incompatibilities he wishes the student to learn.

Some changes and additional statements have been made in Part II. Twenty-five prescriptions with comments have also been added as well as fifty prescriptions without comments. The comments on the last were omitted so that the student can the better test his knowledge.

Since so many incompatibilities are the result of the formation of insoluble compounds it was deemed advisable to introduce a table of solubilities for reference. A table of average prices charged for prescriptions not requiring particular skill or calling for expensive ingredients is also appended, so that those who have not had the drug-store experience may have some idea as to the general prices charged. Attention is called to the complete index of prescriptions

which enables one to find at a glance any prescription containing a certain ingredient or combination of ingredients that is given in the book.

The Author has found this book to be of as much value to medical students as to those in Pharmacy. Since the incompatibility in a prescription originates with the physician, if the subject were better understood by the writer of the prescription there would be less trouble both for physicians and pharmacists.

The Author wishes to thank his many friends for the generous words of encouragement that they have given him.

VANDERBILT UNIVERSITY, June, 1900.

## PREFACE TO THE FIRST EDITION.

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THE busy prescriptionist is frequently at a loss to know what takes place in the prescription he is filling, and does not have the time nor books necessary to look up the change which he has noticed. The object of the first part of this book is to present to him in a convenient and condensed form the more common incompatibilities. The substances treated of are arranged in alphabetical order of their Latin names, except in case of some of the newer remedies. In order to avoid repetition all the incompatibilities of each substance are not always given under that heading. For instance, the reaction between two substances may be found under the heading of one of the substances and not under the other.

The second object of the writer is to furnish the student of pharmacy with a list of incompatible prescriptions in such form that he may find out for himself what the trouble is, and the best means of avoiding or overcoming it. It is suggested that he study the prescription thoroughly before referring to the notes.

Acknowledgment is hereby made of assistance received from all of the books and journals mentioned in the list of abbreviations of references.

EDSEL A. RUDDIMAN.

NASHVILLE, June, 1897.

## ABBREVIATIONS OF REFERENCES.

Allen :	Allen's Commercial Organic Analysis, 2d ed.
A. D. :	American Dispensatory.
Am. D. :	American Druggist.
A. J. A. :	American Journal of Pharmacy.
A. P. A. :	Proceedings of the American Pharmaceutical Association.
Blyth :	Blyth's Poisons, 3d ed.
Br. P. :	British Pharmacopœia, 1898.
Caspari :	Caspari's Treatise on Pharmacy.
Coblentz :	Coblentz's New Remedies, 2d ed.
D. C. :	Druggists' Circular.
Extra Pharm.:	The Extra Pharmacopœia, by Martindale and Westcott, 7th ed.
M. & M. :	Muir and Morley's edition of Watts' Dictionary.
M. M. R. :	Merck's Market Report.
Nat. Drug.:	National Druggist.
N. D. :	National Dispensatory, 5th ed.
N. E. D. :	New England Druggist.
Ph. E. :	Pharmaceutical Era.
P. D. :	Thompson's Practical Dispensing.
P. & J. :	Prescott and Johnson's Qualitative Chemical Analysis, 4th ed.
Potter :	Potter's Materia Medica, 6th ed.
Prescott :	Prescott's Organic Analysis.
R. & S. :	Roscoe and Schorlemmer's Organic Chemistry.
Richter :	Richter's Organic Chemistry.
Sayre :	Sayre's Organic Materia Medica.
Scoville :	Scoville's Art of Dispensing.
Sohn :	Sohn's Dictionary of Active Principles of Plants.
Squire :	Squire's Companion to the British Pharmacopœia, 16th ed.
Storer :	Storer's Dictionary of Solubilities.
U. S. D. :	United States Dispensatory, 17th ed.
U. S. P. :	United States Pharmacopœia, 7th revision.
W. D. :	Western Druggist.
Wade :	Wade's Organic Chemistry, 1897.
Watts :	Watts' Dictionary of Chemistry.



## PART I.

### *INCOMPATIBILITIES.*

**Acacia.**—1. Mucilage of acacia is acid to litmus paper but is not sufficiently acid to cause trouble unless decomposition has commenced. 2. The official mucilage of acacia is gelatinized by a **solution of ferric chloride, tincture of ferric chloride, solution of ferric sulphate, solution of ferric sub-sulphate, or solution of iron and ammonium acetate.** Alkali citrates tend to prevent this coagulation and, in the proportion of about one grain of the citrate to two drams of the tincture of iron, will entirely prevent it. Potassium or ammonium acetate in considerable proportion will prevent coagulation, as will also a rather large excess of hydrochloric acid or other mineral acids. Dilution with water will prevent coagulation; one volume of tincture of iron with an equal volume of water will give a solution with one volume of mucilage of acacia diluted with an equal amount of water. Glycerin or syrup seems to have but little more effect in preventing coagulation than so much water. The color of the mixture of the iron salt and the mucilage is much deeper red than that of the tincture alone. Gelatinized acacia will afterwards slowly dissolve if an excess of water is added. 3. **Solution of dialyzed iron** when mixed with mucilage of acacia forms gelatinous masses, having the color of ferric hydrate, but does not give a translucent mass as does the tincture of iron; dilution with water or the addition of a citrate has but little effect in preventing precipitation. 4. The **solution of**

**ferrous chloride** (N. F.) or a saturated **solution of ferrous sulphate** does not gelatinize mucilage of acacia. 5. A saturated solution of **borax** forms a more or less translucent mass with mucilage of acacia. By diluting the borax solution with an equal volume of water and the mucilage with an equal volume of water, no coagulation takes place. The coagulation may also be prevented by adding three or four drops of glycerin or honey to one dram of the borax solution. Either glycerin or honey decomposes borax to some extent, liberating boric acid, but not enough need be added to make the solution acid. The official syrup or a solution of glucose tends to prevent the coagulation but is not as effective as glycerin. 6. A solution of **lead subacetate** (not the neutral lead acetate), even if quite highly diluted, will give white, opaque, gelatinous masses when mixed with mucilage of acacia. Diluting the mucilage with several volumes of water does not prevent coagulation although glycerin and syrup do to some extent. 7. A solution of an **oxalate** or a **carbonate** when mixed with mucilage of acacia will give a white precipitate of calcium oxalate or calcium carbonate. 8. A saturated solution of **mercuric chloride** with an equal volume of mucilage of acacia slowly gives a white precipitate. 9. Acacia is nearly insoluble in **alcohol**, consequently when alcohol or a preparation containing strong alcohol is added to mucilage of acacia in sufficient amount to make the mixture about fifty or sixty per cent. of alcohol, the acacia is precipitated. The precipitate redissolves on subsequent dilution with water. 10. **Sulphuric acid** converts acacia into arabic and then metarabic acid and precipitates calcium sulphate (U. S. D., 8). Dilute sulphuric acid converts it into a sugar (M. & M., I. 296). A strong solution of a sulphate gives a precipitate of calcium sulphate. 11. Dilute **nitric acid** converts acacia into mucic, saccharic, oxalic, and tartaric acids (U. S. D., 8). 12. In the presence of acacia, dilute solutions of salts of **mercury**, **lead**, **copper**, **antimony**, **silver**, **iron**, or **arsenic** do not give precipitates with **hydrogen sulphide** or **alkaline sulphides**,

although a coloration may be produced. 13. Acacia prevents the precipitation of dilute solutions of salts of **mercury**, **antimony**, **aluminum**, **iron**, **calcium**, and some other metals by **alkali hydrates** or **borax** and in some cases by **carbonates**. 14. Dilute solutions of **alkaloidal salts** in the presence of acacia are not precipitated by **potassium mercuric iodide**, **sodium phosphomolybdate**, or **tannic acid** (Allen, I. 353). These properties are common to many gums (M. & M., I. 296). The solution of the alkaloid must be very dilute or some precipitation will occur. 15. Mucilage of acacia is colored blue, either at once or after standing a short time, by a tincture of **guaiac** if the guaiac is fresh; but with an old guaiac the color is red brown.

**Aceta.** [See under ACIDUM ACETICUM.]

**Acetamid.**—1. Acetamid acts both as an acid and as a base, combining with **bases** or **acids** (Watts, I. 5). With acids it forms unstable compounds (Richter, 259). 2. Boiled with **acids** or **alkalies** is decomposed, forming acetic acid and ammonia (Richter, 259). 3. Acetamid gives a liquid or soft mass when triturated with **antipyrin**, **bromal hydrate**, **butyl chloral hydrate**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **lead acetate**, **pyrocatechin**, **pyrogallol**, **resorcin**, **sodium phosphate**, **thymol**, or **urethane**. 4. With **chloral** it unites directly, forming chloral acetamid (M. & M., I. 5).

**Acetanilidum.**—1. With **spirit of nitrous ether**, **amyl nitrite**, or a solution containing **nitrous acid**, acetanilid gives a yellow solution, becoming red on standing for some time. With a fresh or nearly neutral spirit of nitrous ether the yellow coloration may not be noticed for several days and the red for two weeks or more. The presence of an alkali or a little sodium bicarbonate will prevent the appearance of more than a pale yellow within a month. Probably diazo-compounds are formed. 2. A cold **solution of ferric chloride** with acetanilid gives no increase of color, but, if heated, it assumes a deep red color which fades as the solution cools.

If heat is applied to a concentrated solution for several minutes a dark green color is produced. With the **tincture of iron** acetanilid gives a red color without heating. 3. On adding an aqueous solution of **bromine** to a saturated solution of acetanilid, the color of the bromine is destroyed and a precipitate is formed which at first redissolves but remains permanent on adding more bromine. The precipitate is white, crystalline, and soluble in alcohol. 4. A solution of **iodine** does not readily precipitate an aqueous solution of acetanilid. 5. The alkali **bromides** or **iodides** in aqueous solution with acetanilid form insoluble compounds (Coblentz, 1). This statement is only partly true. If thirty grains of potassium bromide are added to a fluid dram of a saturated solution of acetanilid, a fine white precipitate is formed at once. This may be due to the acetanilid being less soluble in a solution of a bromide than it is in water. If the thirty grains of bromide are dissolved in one dram of water and then added, no precipitation takes place in a week. If thirty grains of potassium iodide are added to one dram of a saturated solution of acetanilid, no precipitation occurs. 6. Acetanilid is slowly decomposed by a strong solution of **potassium** or **sodium hydrate**, forming anilin (U. S. D., 10). 7. A dry mixture of acetanilid and **calomel** shows no perceptible change within a month. On allowing a mixture of these with water to stand for six weeks, there was no change in the color of the calomel and the filtrate gave no test for a mercuric salt. After heating a mixture of acetanilid and calomel in water acidulated with hydrochloric acid and allowing to stand for six weeks, the filtrate gave a test for a mercuric salt. 8. When acetanilid is rubbed with **chloral hydrate**, a sticky mass is said to be produced (M. M. R., iv. 359), but the writer only got a slightly damp powder after hard trituration. Chloral hydrate increases the solubility of acetanilid in water; a mixture of ten grains of chloral hydrate with one grain of acetanilid will dissolve in about five minims of water and further addition of water does not cause pre-

cipitation. 9. Rubbing acetanilid with **resorcin** gives a soft mass which liquefies on standing. Water seems to dissolve the resorcin but not the acetanilid. The mass is soluble in alcohol. 10. Acetanilid triturated with **thymol** gives a soft mass which is soluble in alcohol but not in water. Gently mixing the two without rubbing produces a mass which soon liquefies. 11. When acetanilid is triturated with **chloral alcoholate**, **carbolic acid**, or **pyrocatechin** a mass or liquid results which is soluble in alcohol but insoluble or only partly soluble in water. 12. Triturating acetanilid with **antipyrin** ordinarily produces a dry powder, but by rubbing hard a damp powder can be obtained. Alcohol dissolves the mixture, but water seems to dissolve only the antipyrin. 13. When **sodium salicylate** is mixed with acetanilid a pink powder is said to be produced, but the writer did not get much increase of color, although the paper containing the mixture became colored after a time. 14. Acetanilid is readily soluble in a hot solution of **tartaric acid** from which it does not recrystallize on cooling (P. D., 19). However, a hot solution of three grains of acetanilid and fifteen grains of tartaric acid in three drams of water gave an abundant precipitate of crystals on cooling. 15. **Strychnine** and **atropine** are somewhat antagonistic physiologically to acetanilid.

**Acetates.** [See under ACIDUM ACETICUM.]

**Acida.**—1. Acids combine with **metallic oxides** and **hydrates**, with some **metals**, and with some **alkaloids** to form salts. 2. Mineral acids and some organic acids, such as tartaric or acetic, precipitate bismuth citrate from solutions of **bismuth and ammonium citrate** by combining with the ammonium. 3. Mineral and common organic acids precipitate potassium bitartrate from concentrated solutions of **Rochelle salt**, normal **potassium tartrate**, or double tartrates containing potassium. 4. Nitric, hydrochloric, or sulphuric acid with an aqueous solution of **tartra emetic** gives a precipitate consisting of a basic nitrate, chloride, or sulphate of antimony. 5. Mineral acids give a precipitate of

the phosphate or the pyrophosphate of iron when added to a solution of the official **soluble phosphate** or **pyrophosphate of iron**. 6. Strong mineral acids precipitate, from concentrated solutions of **borates**, **salicylates**, or **benzoates**, the boric, salicylic, or benzoic acid. 7. Strong mineral acids form esters and ethers with **alcohol**. Many organic acids in the presence of mineral acids, as sulphuric or hydrochloric, form esters with alcohol. 8. Nearly all acids, except hydrocyanic and hydrosulphuric, decompose **carbonates**, liberating carbon dioxide. 9. Acids diminish or prevent the action of **pancreatin**. 10. Many acids precipitate **albuminous substances** from aqueous solution. 11. Organic acids, except acetic, combined with an alkali, generally form compounds with the **heavy metals** that are insoluble in water. 12. Frequently mineral acids displace organic acids and the stronger mineral acids the weaker ones.

The following official preparations contain a free acid: 13. the vinegars of opium and squills; 14. hydrogen dioxide water; 15. styptic collodion; 16. fluid extracts of conium, ergot, nux vomica, and sanguinaria; 17. fluid extracts in general are acid to litmus, some sufficiently acid to liberate carbon dioxide from carbonates; 18. glycerites of tannic acid and boroglycerin; 19. solutions of arsenous acid, ammonium acetate, chloride of iron, citrate of iron, iron and ammonium acetate, nitrate of iron, subsulphate of iron, tersulphate of iron, and nitrate of mercury; 20. oleates of mercury, veratrine, and zinc; 21. spirit of nitrous ether, usually; 22. syrups of citric acid, hydriodic acid, garlic, calcium lactophosphate, hypophosphites, ipecac, iron quinine and strychnine phosphates, and squills; 23. tinctures of chloride of iron and sanguinaria; 24. ointment of tannic acid and usually ointment of mercuric nitrate. 25. Besides these there are some substances which become acid on exposure, as acetic ether, spirit of nitrous ether, amyl nitrite, oil of bitter almonds, and chlorine water.

26. There are quite a number of salts that are acid in re-

action and sufficiently so to give an effervescence with a carbonate. Some of the more common are: alum, aluminum sulphate, bismuth subnitrate, ferric chloride, ferric citrate, iron and quinine citrate, iron and strychnine citrate, ferrous sulphate, lead acetate, lead nitrate, quinine bisulphate, zinc acetate, and zinc sulphate.

**Acidum Aceticum.**—1. Acetic acid decomposes nearly all **carbonates**, liberating carbon dioxide and forming acetates. 2. It forms chloracetic acid with **chlorine**, slowly in diffused light, more quickly in sunlight. 3. Soluble neutral acetates, or the free acid if it is concentrated and the solution of iron salt is weak, with solutions of **ferric salts**, give a deep red coloration. The color varies from a yellow red to a dark red, according to the dilution, due to the formation of ferric acetate, which on heating precipitates as the basic ferric acetate. The strong mineral acids in excess prevent the formation of the color. 4. Acetic acid aids the solution of **quinine sulphate** in water, increasing the fluorescence. This solution does not precipitate on standing, but on adding potassium acetate the fluorescence is destroyed and, if it is a fairly strong solution of quinine, needle-shaped crystals will be formed in a few minutes. Experiments made indicate that double decomposition takes place, forming quinine acetate and potassium sulphate. The precipitation may be due partly to the quinine acetate being only sparingly soluble and partly to the quinine salt being less soluble in a solution of potassium acetate. The precipitate formed may be dissolved by the further addition of acetic acid and again thrown down by adding potassium acetate, the amount of potassium acetate necessary seeming to depend on the excess of acetic acid used. It may be that the potassium acetate combines with the acetic acid (as explained in R. & S., III. part I. 497), forming potassium diacetate, thus taking up the free acid. Potassium acetate in sufficient amount will destroy the fluorescence and give a precipitate with a solution of quinine bisulphate or quinine sulphate dissolved in water by the aid of sulphuric acid. It has been suggested that

quinine hydrate is formed, the acetic acid being too weak to hold the hydrate in solution (M. M. R., IX. 158). 5. A mixture of **alcohol**, **sulphuric acid**, and acetic acid or an acetate gives ethyl acetate, which has a fruity odor. 6. An aqueous solution of potassium acetate with **spirit of nitrous ether** produces an effervescence. Nitrous acid converts acetates into carbon monoxide and other gases (Scoville, 223). [See comment on prescription No. 350.] 7. The stronger **mineral acids** transpose acetates, liberating acetic acid. 8. Acetic acid is not sensibly affected by **nitric acid** or readily changed by **oxidizing agents**. 9. Strong acetic acid is a good solvent for **resins**, **gum-resins**, **camphor**, and **volatile oils**. 10. Some acetates, as lead, on being exposed to the **air** lose acetic acid and absorb carbon dioxide, becoming partly insoluble. 11. Nearly all normal acetates are readily soluble in water, except quinine, silver, and mercurous. The acetates, except silver and mercurous, are generally soluble in alcohol. [See ACIDA.]

**Acidum Arsenicum.**—1. The normal alkali arsenates, as sodium arsenate, precipitate neutral solutions of salts of nearly all other common **metals**, as arsenates. Sodium arsenate is sometimes alkaline, and may cause precipitation on this account. The precipitate is soluble in mineral acids and sometimes in the presence of ammonium salts. 2. **Tannic acid** with a not too dilute solution of sodium arsenate gives a yellow-brown precipitate, the precipitate and the liquid changing to a dark green within a day or two. 3. In acid solutions arsenates are reduced to arsenites by **hypophosphites**, **sulphites**, and **iodides**, forming respectively phosphoric acid, sulphuric acid, and iodine. 4. Sodium arsenate precipitates solutions of many **alkaloidal salts**, due perhaps to the fact that the arsenate is frequently alkaline and in some cases to the formation of an insoluble alkaloidal arsenate. 5. The arsenates of the alkali metals are soluble in water. The di- and tri-metallic salts of the other metals are insoluble in water, but soluble in the presence of most min-



eral acids. The arsenates are generally insoluble in alcohol.

**Acidum Arsenosum.**—1. Arsenous acid combines with **alkali hydrates** and **carbonates** to form arsenites. 2. The soluble arsenites (generally not the free acid) precipitate neutral solutions of nearly all **metallic salts**, except those of the alkalis. 3. **Ferric hydrate** or a solution of **dialyzed iron** gives an insoluble basic arsenite with a solution of an arsenite or arsenous acid. To some extent this is changed to a basic ferrous arsenate (P. & J., 118). 4. Arsenous acid is said to combine with **potassium acid tartrate** to form a double salt, analogous to tartar emetic (Watts, v. 686). 5. A solution of **potassium iodide** with arsenous acid or potassium arsenite yields a precipitate of  $(KI)_2(As_2O_3)$  which is sparingly soluble in water (Watts, I. 373). One dram of potassium iodide dissolved in one dram of Fowler's solution gives only a slight precipitate. 6. Fowler's solution gives a brown-white precipitate with **lime water**. 7. With **tannic acid**, it gives a nearly white precipitate which with the liquid turns to a dark, dirty green in less than a day. 8. With a solution of **mercuric chloride** Fowler's solution gives a white precipitate, consisting of a mercurous salt. If the Fowler's solution is in large excess there will be formed a white precipitate at first and in a few hours a dark gray precipitate of metallic mercury. 9. Fowler's solution is alkaline and may precipitate solutions of **alkaloidal salts** and other **neutral salts**. 10. Arsenous compounds are oxidized to arsenic compounds by **nitric acid**, **chlorine**, **chlorates** in acid solution, **iodine** in alkaline solution, **silver salts** in alkaline mixtures, **mercuric** or **mercurous compounds** in alkaline mixtures, **ferric compounds** in alkaline mixtures, **permanganates**, or **chromates**. 11. Arsenous compounds are reduced to metallic arsenic by **hypophosphites** in acid mixtures. 12. Arsenites of potassium, sodium, or ammonium are soluble in water; barium and strontium are sparingly soluble; the other metallic arsenites are insoluble. They are generally

dissolved and decomposed by dilute **mineral acids**. [See ACIDA.]

**Acidum Benzoicum.**—1. Benzoic acid combines with the **hydrates** of the **alkalies** and **calcium** to form benzoates. 2. It liberates carbon dioxide from **carbonates**. 3. Soluble benzoates precipitate nearly neutral solutions of **ferric salts** as ferric benzoate, which is flesh colored. The presence of an excess of free acid or of alkali tartrates interferes with or prevents the precipitation. 4. Sodium benzoate gives precipitates with solutions of salts of **silver, mercury, and lead**, the latter being somewhat soluble in excess of lead acetate. 5. Sodium benzoate gives a white, sticky precipitate when it is added to a solution of **quinine bisulphate** or to a slightly acidulated solution of **quinine sulphate** if the quinine solution is not too dilute. Quinine benzoate is soluble in about 370 parts of water and more soluble in alcohol. 6. **Hydrogen dioxide** with a little sulphuric acid converts benzoic acid into salicylic acid (M. & M., I. 470). 7. Benzoic acid is not readily attacked by **nitric** or **chromic acid**. 8. Concentrated aqueous solutions of benzoates give a crystalline precipitate of benzoic acid when dilute solutions of strong **acids** are added. 9. Most benzoates are soluble in water and many are soluble in alcohol. The more sparingly soluble benzoates dissolve readily in aqueous solutions of sodium acetate, lead acetate, or sodium nitrate (Storer, 61). 10. The solubility of the free acid in water is increased by the presence of borax, alkali citrates, or sodium phosphate. 11. Benzoic acid dissolves in a concentrated solution of **sodium sulphite**, forming sodium benzene-sulphinate which is very soluble (Allen, III. part I. 12). [See ACIDA.]

**Acidum Boricum.**—1. Boric acid combines with the **hydrates** of the **alkalies** and the **alkaline earths** to form borates. 2. It decomposes **carbonates** of the **alkalies** and of the **alkaline earths**, liberating carbon dioxide, but under certain conditions carbon dioxide may decompose borates. 3. The alkali borates, as borax, give precipitates with nearly

neutral solutions of salts of several **metals**, the precipitate being more or less soluble in excess of the metallic salt or in the presence of ammonium chloride (Watts, 1. 641); 4. with **mercuric chloride** the precipitate is the red-brown basic mercuric chloride (Watts, 1. 641); 5. with **silver nitrate** the precipitate is silver borate (sometimes mixed with a little oxide); 6. with **lead acetate**, **barium chloride**, or **calcium chloride** the precipitate is a borate of the metal (P. & J., 164); 7. with **alum** the precipitate is aluminum hydroxide; 8. with **zinc sulphate** the precipitate may be chiefly a borate or a mixture of the borate with a basic compound (Watts, 1. 649); 9. with **ferric salts** a basic borate is formed (Watts, 1. 530). 10. The alkali borates are alkaline in reaction, consequently cause a precipitation with most **alkaloidal salts**, liberating the alkaloid. 11. Concentrated solutions of borates give a precipitate of boric acid with nearly all **mineral acids**. 12. All of the borates, excepting the alkali borates, are nearly insoluble in water but are generally soluble in the presence of **free boric**, **tartaric**, and **mineral acids**. They are all nearly insoluble in alcohol. 13. The solubility of the free acid is increased by the presence of **tartaric acid**, **potassium tartrate**, or **Rochelle salt**, the salts being partially decomposed (Watts, 1. 639). Boric acid seems to act the part of a base with tartaric acid (Watts, 1. 648). [See ACIDA and SODII BORAS.]

**Acidum Carbolicum.**—1. Carbolic acid exposed to the **air** absorbs enough of moisture to liquefy it. 2. On exposure to **air** and **light** it becomes pink, red, and even brown. This is probably due to several causes, no explanation being entirely satisfactory. 3. Carbolic acid with **ammonia water** gives a colorless solution which slowly becomes green, then deep blue, and finally purplish blue. 4. With **ammonia water** and a solution of **chlorinated soda** it gives a deep blue. 5. Carbolic acid combines with concentrated solutions of **fixed alkali hydrates** to form carbolates. It does not combine with alkali carbonates, except

perhaps on boiling. 6. Alkaline solutions of carbolic acid absorb atmospheric **oxygen**, forming dark-colored products. 7. Carbolic acid with the U. S. P. solution of **ferric chloride** gives no change in color but on adding water a green is produced and on further dilution gives a violet-blue color. This violet-blue color is prevented or destroyed by most mineral and organic acids, by some salts, and by many organic substances such as alcohol, ether, and glycerin. 8. **Gelatin** is completely dissolved by strong carbolic acid but is coagulated when the acid is added in excess to its aqueous solution (Allen, II. 539). 9. Carbolic acid coagulates aqueous solutions of **albumin**. 10. It coagulates **collodion** (difference from creosote), separating the nitro-cellulose as a gelatinous mass. 11. **Hydrogen dioxide** oxidizes it to pyrocatechin, quinone, and hydroquinone (M. & M., III. 832). The solution becomes yellow to red brown on standing. 12. **Potassium permanganate** oxidizes it to oxalic acid and carbon dioxide (N. D., 39). 13. **Nitric acid** oxidizes it to mono-, di-, and tri-nitrophenol, the latter being picric acid. 14. **Nitrous acid** forms nitroso-phenol. **Spirit of nitrous ether** with carbolic acid gives a yellow color, changing to a red brown in a few minutes, then to a deep brown-red; after some hours a precipitate forms. 15. Carbolic acid with strong **sulphuric acid** forms phenol-sulphonic acid. 16. Phenol is scarcely, if at all, attacked by **iodine** (Watts, IV. 390). 17. An aqueous solution of phenol with **bromine water** gives a crystalline precipitate of tribromo-phenol which is not so very soluble in dilute alcohol. 18. Carbolic acid reduces salts of several of the **metals**, as **silver**, **copper**, and **mercury**. 19. On mixing aqueous solutions of carbolic acid and **antipyrin** an oily liquid settles to the bottom. 20. Crystalline carbolic acid gives a soft mass or a liquid when triturated with **acetamid**, **acetanilid**, **antipyrin**, **borneol**, **bromal hydrate**, **butyl chloral hydrate**, **camphor**, **monobromated camphor**, **chloral alcoholate**, **chloral hydrate**, **chloralamid**, **diuretin**, **euphorin**,

exalgin, lead acetate, menthol, methacetin, naphthalin, naphthol, phenacetin, pyrocatechin, pyrogallol, resin, resorcin, salol, sodium phosphate, terpin hydrate, thymol, or urethane. These reactions are due in some cases to the formation of new chemical compounds, and in some cases probably to the fact that carbolic acid is hygroscopic, and also that it liquefies when warmed by trituration. 21. **Atropine**, hypodermatically, is a very complete physiological antagonist, maintaining the heart and respiration (Potter, 77). Recent experiments indicate that **alcohol** is in some way antagonistic to carbolic acid.

**Acidum Chromicum.**—1. Chromic acid combines with the **alkali hydrates** to form yellow normal chromates and red dichromates. 2. Chromic acid, or chromates in solution with sulphuric acid, are reduced to chromic salts by **tartrates**, producing formic acid, carbon dioxide, and water; 3. by **oxalates**, forming carbon dioxide; 4. by **hypophosphites** (no action in alkaline mixtures), forming phosphoric acid; 5. by **sulphides**, liberating sulphur; 6. by **sulphites**, forming sulphuric acid; 7. by **chlorides**, liberating chlorine; 8. by **bromides**, liberating bromine; 9. by **iodides**, liberating iodine; 10. by **dilute alcohol**, forming aldehyde and acetic acid. 11. Chromic acid, with **strong alcohol**, **glycerin**, **ether**, **volatile oils**, or other readily oxidizable matter, is liable to cause an explosion or fire. 12. The soluble chromates and bichromates precipitate aqueous solutions of salts of **lead**, **silver**, **mercury**, **bismuth**, **manganese**, **barium**, and **strontium** as chromates, generally normal, varying in color from yellow to red. 13. Potassium bichromate precipitates many **alkaloids** from aqueous solutions of their salts, e.g., **atropine**, **codeine**, **hydrastine**, **quinine**, **strychnine**, **morphine** (only in concentrated solutions, 1 : 100). The normal potassium chromate does not precipitate as many of the alkaloids as the bichromate. 14. Bichromates are liable to cause an explosion when triturated with **tannic acid**, **sugar**, or other substances that are easily oxidized. 15. The chromates of

the alkalis, magnesium, calcium, and zinc are soluble in water; the others are sparingly soluble. They are nearly insoluble in alcohol.

**Acidum Chrysophanicum.**—1. Chrysophanic acid is dissolved by aqueous solutions of **alkalis**, forming a liquid which is pink when dilute and dark purplish-red when concentrated. This solution, when neutralized with acids, precipitates the yellow chrysophanic acid (Allen, III. part I. 282). 2. An ammoniacal solution of chrysophanic acid gives a lilac-colored precipitate with **acetate of lead** and rose-colored with **alum** (Allen, III. part I. 283).

**Acidum Citricum.**—1. Citric acid forms citrates with most metallic **hydrates** or **carbonates**, with most **acetates**, with **alkaline sulphides**, and with **soap**. 2. With a strong solution of **potassium tartrate** or **Rochelle salt** citric acid forms sodium citrate and potassium bitartrate which is precipitated. 3. A strong solution of citric acid gives a precipitate with a solution of **bismuth and ammonium citrate**, but it may take several hours. 4. Soluble citrates and citric acid when heated with **lime water** give a precipitate of calcium citrate. 5. Neutral soluble citrates precipitate solutions of **lead acetate** and **silver nitrate** as citrates, both being soluble in excess of the precipitant. 6. The normal magnesium citrate is sometimes precipitated in the official **solution of magnesium citrate** when the citric acid is not present in considerable excess. 7. An alkaline solution of a citrate with **chlorine** gives some chloroform (M. & M., II. 194). 8. Citric acid is oxidized to acetic and oxalic acids by concentrated **nitric acid** (P. & J., 178); it is scarcely attacked by dilute nitric acid (Watts, I. 996). 9. An acidulated solution of **potassium permanganate** oxidizes it to carbon dioxide and acetone (Allen, I. 453). The free acid is scarcely if at all affected by the permanganate (Prescott, 88). 10. Neutral or nearly neutral solutions of salts of **aluminum, iron, nickel, manganese, antimony, mercuric mercury, copper, zinc, chromium, calcium, or magnesium**, in the presence of the

alkali citrates, are not generally precipitated by the alkali **hydrates**, **carbonates**, **phosphates**, or by **borax**. The citrates also sometimes prevent precipitation of the metals by **oxalates** and **sulphates**. In many instances there are double compounds formed. If heat be applied precipitation may take place. 11. The insoluble citrates are transposed by the dilute **mineral acids**. 12. When a drug containing **tannin** is added to a mixture of a **ferric salt** and an alkali citrate, there is a darkening, but the citrate tends to prevent the formation of the black tannate of iron. 13. Citric acid aids the solution of **quinine sulphate** in water and the solution is fluorescent. If an alkali citrate is now added to this the fluorescence is destroyed and in a few minutes a crystalline precipitate forms. This may be dissolved by the further addition of citric acid or a mineral acid. Quinine citrate is soluble in 806 parts of water (N. D., 1326). 14. The presence of an alkali citrate increases the solubility in water of some acids as **gallic**, **salicylic**, and **benzoic**. 15. The citrates of the alkalis are soluble in water; those of iron, zinc, and copper are moderately soluble; the other single citrates are nearly insoluble. Citric acid in excess converts the insoluble citrates into the more soluble acid citrates, and the alkali citrates convert them into the more soluble double citrates. [See ACIDA.]

**Acidum Gallicum.**—1. An aqueous solution of gallic acid soon decomposes when exposed to **air**, giving off carbon dioxide, turning yellow, brown, and black, and depositing a black substance; this coloration is hastened by alkali hydrates, forming tanno-melanic acid (Allen, III. part I. 68). 2. Gallic acid combines with **alkali hydrates**. In mixtures of the acid and a solution of potassium or sodium hydrate, when the acid is in excess, the color becomes green; when the alkali is in excess, the color is yellow, changing to red and brown. 3. Gallic acid in excess with **ammonia water** gives a yellow color, but when the ammonia is in excess the color is red brown. 4. It decomposes alkali **carbonates**, liberating carbon dioxide and producing colorations similar to those given

when added to fixed alkali hydrates. 5. With an excess of **sodium bicarbonate** a solution of gallic acid turns brown, then green and ultimately blue, and gives a precipitate of a deep blue-green solid (Allen, III. part I. 68). 6. Gallic acid with **lime water** in excess gives a blue-white precipitate, and the liquid acquires a tint which is blue by reflected and green by transmitted light, and becomes pink with a large excess of lime water. If the acid is in excess the color is brown. 7. Gallic acid gives a blue-black solution or precipitate with a solution of **ferric chloride**. With an excess of the iron the color is green blue to a green brown. Heat changes the blue-black color to brown, due (according to Allen, III. part I. 68) to the reduction of the ferric iron to the ferrous condition, or (according to the U. S. D., 50) to the conversion of gallic acid into pyrogallic or metagallic acid. 8. Gallic acid with a strong solution of a pure **ferrous salt** gives a white precipitate. On exposure to air the mixture soon becomes colored, due to the oxidation of the iron. 9. With a solution of **potassium cyanide** gallic acid gives a transient red color. 10. With a solution of **tartar emetic** it gives a precipitate of galate of antimony; in dilute solution the precipitation is prevented by ammonium chloride. 11. Gallic acid produces a precipitate when added to a solution of **lead acetate**. 12. It reduces salts of **silver** and **gold** to the metals. 13. Oxidizing agents, such as **arsenic acid**, **silver nitrate**, or **iodine**, with water, convert gallic acid into elagic acid (Richter, 783). 14. Triturating gallic acid with **potassium permanganate** may cause the acid to take fire. 15. With **spirit of nitrous ether** gallic acid or a solution of gallic acid produces an effervescence and gives a red color. 16. Gallic acid does not precipitate solutions of alkaloids, gelatin, albumin, or starch, but a mixture of **gum acacia** and **gelatin** is precipitated (Allen, III. part I. 68). 17. The solubility in water of the free acid is increased by borax or alkali citrates. 18. The gallates of the alkalies are soluble, but the others are nearly insoluble in water and generally insoluble in alcohol.



**Acidum Hydriodicum.**—1. Hydriodic acid and ammonium iodide on being exposed to **air** and **light** liberate iodine. 2. An alkali iodide in aqueous solution with **mineral acids**, certain **organic acids** as citric or tartaric, or some **neutral salts** as ammonium nitrate is quite easily decomposed, liberating iodine. In some cases an intermediate product is hydriodic acid, which is oxidized by the air. 3. Hydriodic acid and soluble iodides precipitate solutions of salts of **lead**, as the bright yellow lead iodide. This is prevented to some extent by alkali acetates. 4. They precipitate salts of **silver**, as the yellow-white silver iodide; of **mercurous mercury**, as the yellow mercurous iodide; of **mercuric mercury**, as the red mercuric iodide. 5. The alkali iodides in excess form double compounds with **lead**, **silver**, and **mercuric iodides**, which compounds are soluble. The solution of the double salt of mercuric and potassium iodide  $(KI)_2HgI_2$  is known as "Mayer's reagent," and precipitates nearly all alkaloids from their aqueous solutions. 6. **Mercurous iodide** with an excess of potassium iodide in the presence of water is decomposed, forming metallic mercury and mercuric iodide, the latter combining with potassium iodide to form the potassium mercuric iodide. 7. **Calomel** with water and an excess of potassium iodide forms mercurous iodide and potassium chloride; the mercurous iodide is decomposed as given under No. 6. 8. Soluble iodides reduce **cupric salts** in solution and give a white precipitate of cuprous iodide; at the same time the solution turns red, due to the liberation of iodine. 9. Soluble iodides with **ferric salts** in acid solutions reduce the ferric to ferrous iron, but give no precipitate of iron; iodine is liberated and if all of the iodide is decomposed may be precipitated. 10. When **bismuth subnitrate** is added to syrup of hydriodic acid it is changed to a yellow substance at once which further changes to orange-red and then to dark gray. Sometimes the ultimate precipitate seems to consist of two different substances, one yellow and the other gray. When bismuth subnitrate is added to a solution of potassium iodide it assumes a

yellow color in a few hours and within a day it has changed to a deep red. The color varies with the iodide formed;  $\text{BiOI}$  is red;  $3\text{BiOI}, 4\text{Bi}_2\text{O}_3$  is yellow;  $\text{BiI}_3$  is dark gray (M. & M., I. 513). 11. **Spirit of nitrous ether**, or **nitrites** in acid solution, liberate iodine from iodides and give off oxides of nitrogen. 12. **Nitric** or **nitrohydrochloric acid** liberates iodine from iodides and, if sufficiently concentrated, oxidizes it to iodic acid. 13. **Chlorine** oxidizes iodides, forming iodine then iodic acid and in an alkaline mixture a periodate. The chlorine is changed to a chloride. 14. **Chlorates** in an acid solution of an iodide liberate iodine and then change it to iodic acid. Probably a similar reaction takes place in the stomach when a chlorate and an iodide are taken together. 15. **Iodates** in acid solution with iodides liberate iodine from both. Iodides sometimes contain iodates as impurities, hence the liberation on adding an acid. 16. **Arsenic compounds** in acid solution with iodides liberate iodine and become arsenous. 17. A solution of potassium iodide with **arsenous acid** or **potassium arsenite** yields a precipitate of  $2\text{KI}, 3\text{As}_2\text{O}_3$  which is sparingly soluble in cold water (Watts, I. 377). When one dram of potassium iodide is added to one fluid dram of the U. S. P. solution of potassium arsenite, a white precipitate forms in a few hours; if half that amount of iodide is added the precipitation may not take place for several days. 18. **Chromates** in acid solution liberate iodine and form chromic salts. 19. **Permanganates** in acid solutions liberate iodine and, if in great excess, oxidize it to iodic acid. 20. **Hydrogen dioxide** in acid solution liberates iodine from iodides, slowly in neutral mixtures. 21. The iodides sometimes contain carbonates and would then have the incompatibilities of the carbonates. 22. The alkali iodides precipitate aqueous solutions of many **alkaloidal salts**. In some cases this is due to the formation of compounds that are less soluble in water than the original salt. When a large excess of the alkali iodide is used it may render the alkaloidal salt less soluble in the solution than it is in water. The precipitation

in other cases is due to the carbonate occurring as an impurity in the iodide. The presence of alcohol prevents the precipitation to a considerable extent. The prescribing of strychnine sulphate with potassium iodide is particularly dangerous because the precipitation may not take place for some time. A solution of one twelfth of a grain of strychnine sulphate with five grains of potassium iodide and two drams of water does not usually precipitate at once, but may do so within a few hours. 23. The lead, silver, mercurous, mercuric, cuprous, bismuth, and stannous iodides are nearly insoluble in water; all others are soluble. Nearly all iodides, except lead, silver, and mercurous, are soluble in alcohol. [See ACIDA.]

**Acidum Hydrobromicum.**—1. The soluble bromides and hydrobromic acid precipitate solutions of salts of **lead, silver, and mercurous mercury** as bromides. 2. In concentrated aqueous mixtures alkali bromides form double soluble compounds with lead or silver bromide, which double compounds are broken up by a large amount of water. 3. An aqueous solution of an alkali bromide or of hydrobromic acid causes **calomel** to turn black and the filtrate gives a test for a mercuric salt. Probably a reaction takes place similar to the one explained under ACIDUM HYDRIODICUM, No. 6. 4. Alkali bromides precipitate strong solutions of **mercuric salts** as mercuric bromide which is soluble in excess of the mercuric salt or of the alkali bromide. 5. Bromides with **nitric acid** give bromine. 6. **Chlorine** forms bromine and hydrochloric acid. In alkaline mixtures a bromate is formed. 7. **Chlorates** in acid solution give bromine and hydrochloric acid. 8. **Iodates** in acid solution with bromides liberate iodine and bromine. 9. Bromides in acid solutions reduce **permanganates** to manganous salts and liberate bromine. 10. **Chromates** in acid solution with bromides form chromic salts and bromine. 11. The alkali bromides precipitate some of the **alkaloids** from the solutions of their salts similar to the alkali iodides [see ACIDUM HYDRIODICUM, No. 22] but are not as apt to do so. The presence of alcohol generally

prevents this precipitation. 12. The alkali bromides sometimes contain carbonates as impurities and would then have the incompatibilities of carbonates and the solution would be alkaline. 13. The metallic bromides are soluble in water, except lead, mercury, silver, copper, and bismuth. They are generally somewhat soluble in alcohol. [See ACIDA.]

**Acidum Hydrochloricum.**—1. Hydrochloric acid and the soluble chlorides precipitate as chlorides solutions of salts of **lead**, **silver**, and **mercurous mercury**. 2. With a solution of **tartar emetic** hydrochloric acid gives a precipitate of basic chloride of antimony. 3. Hydrochloric acid with **chlorates** gives chlorine and various chlorides of oxygen. 4. Concentrated hydrochloric acid with concentrated **nitric acid** gives chlorine and oxychlorides of nitrogen. 5. **Permanganates** liberate chlorine from hydrochloric acid and are reduced to manganous chloride. 6. **Chromates** form chromic chloride and free chlorine. 7. Bismuth citrate is precipitated from a solution of **bismuth and ammonium citrate** when hydrochloric acid is added to it. 8. Some writers say that chlorides aid the conversion of **calomel** to mercuric chloride. [See HYDRARGYRUM, No. 7.] 9. The soluble chlorides give hydrochloric acid when treated with **sulphuric acid**. 10. Hydrochloric acid, being stronger than most other acids, except sulphuric and nitric, very frequently displaces other acids when they are combined with bases. 11. The soluble chlorides when added so as to make a concentrated solution with a solution of an **alkaloidal salt** may precipitate the alkaloid. 12. Hydrochloric acid added to an alcoholic solution of **myrrh** gives a red to a violet color; added to an alcoholic solution of **balsam of Tolu** gives a yellow color, changing through brown to cherry red; with many **resins** a brown color is produced. 13. The normal chlorides, except lead, mercurous, and silver, are soluble in water. Many of the chlorides are soluble in alcohol. [See ACIDA.]

**Acidum Hydrocyanicum Dilutum.** — 1. The aqueous solution of hydrocyanic acid decomposes into the formate of ammonium (Richter, 266). 2. Potassium cyanide in aqueous solution is decomposed on standing, giving potassium formate and ammonia (Watts, II. 218). 3. An aqueous solution of potassium cyanide is quite strongly alkaline, and this alkalinity increases with exposure, due to the absorption of carbon dioxide and the volatilization of the hydrocyanic acid. 4. Concentrated **mineral acids** produce formic acid and a salt of ammonium (Watts, II. 199). 5. Hydrocyanic acid and the soluble cyanides, except mercuric cyanide, precipitate the white silver cyanide from solutions of **silver salts**; the precipitate forms soluble double compounds with the alkali cyanides. 6. They decompose **mercurous compounds**, forming metallic mercury and mercuric salts. In case of **calomel** the powder is turned dark at once on account of the metallic mercury. 7. The alkali cyanides precipitate solutions of **lead salts** as white lead cyanide. 8. The alkali cyanides precipitate solutions of **copper salts** as the yellow-green copper cyanide, which is soluble in excess of the alkali cyanide. 9. Potassium cyanide with a solution of **ferrous sulphate** gives a brown precipitate of ferrous cyanide which dissolves in excess of the alkali cyanide forming potassium ferrocyanide. 10. **Nitric acid** decomposes cyanides with the evolution of nitrogen and other gases (N. D., 65). 11. With **hydrogen dioxide** and sulphuric acid cyanides are decomposed, forming oxamid (U. S. D., 64). 12. Cyanides reduce **potassium permanganate** and are changed to carbon dioxide, nitric, nitrous, oxalic, and formic acids (M. & M., II. 346). 13. **Chlorine** or **chlorinated lime** with a solution of potassium cyanide forms chloride of cyanogen and hydrochloric acid (M. & M., II. 302). 14. With a concentrated solution of **iodine** potassium cyanide forms potassium iodide and iodide of cyanogen (M. & M., II. 342). Even in dilute solutions the color of iodine is destroyed. 15. Rubbed with **potassium nitrate** or **chlorate**, potassium cyanide detonates

violently. 16. If potassium cyanide and **chloral hydrate** are rubbed together reaction takes place with the evolution of a large volume of white fumes. 17. Aqueous solutions of the alkali cyanides being alkaline may precipitate **alkaloids** from solutions of their salts as the free alkaloids. 18. Cyanides of the alkalies and alkaline earths are decomposed by all **acids**, even carbonic, with the liberation of hydrocyanic acid. 19. The cyanides of the alkalies and the alkaline earths and mercuric cyanide are soluble in water; the others are made soluble in the presence of the alkali cyanides by forming double compounds. Excepting mercuric cyanide they are generally insoluble in alcohol. 20. **Atropine** and **ammonia** are physiologically antagonistic to cyanides in that they quicken the heart beat.

**Acidum Hypophosphorosum Dilutum.**—1. Dilute hypophosphorous acid is oxidized to phosphorous and phosphoric acids on exposure to **air**. 2. Hypophosphorous acid and hypophosphites in acid solution are oxidized to phosphoric acid by nearly all **oxidizing agents**, and cause a reduction of these agents. 3. **Nitrous** or **nitric acid** forms nitric oxide. 4. **Sulphurous acid** forms sulphur. 5. **Chlorine** and **chlorates** are changed to hydrochloric acid or chlorides. 6. **Iodine** is reduced to hydriodic acid. 7. **Mercurous** and **mercuric compounds** are reduced to the metal, even in neutral and alkaline mixtures. **Calomel** is turned dark at once when mixed with potassium hypophosphite. 8. **Permanganates** are changed to manganous compounds (to manganese dioxide in alkaline mixtures). 9. **Chromates** form chromic salts. 10. **Cupric sulphate** with hypophosphorous acid gives a precipitate of cuprous hydride which begins to form after an hour or more. Copper sulphate with potassium hypophosphite gives a white precipitate. 11. **Bismuth subnitrate** with a solution of potassium hypophosphite in the presence of moisture becomes brown in an hour or two. Bismuth is reduced from the condition having a quantivalence of three to that having a quantivalence of two.

(P. & J., 220). 12. In the presence of hydrochloric acid **arsenic acid** is reduced to arsenous acid and then to metallic arsenic (P. & J., 220). 13. **Ferric salts** are reduced to ferrous (P. & J., 221). When an alkali hypophosphite is added to a solution of ferric chloride a white precipitate of ferric hypophosphite is formed which is dissolved by adding a large excess of hydrochloric acid or an alkali citrate in considerable amount. 14. Compounds of **silver** and **gold** are reduced to the metals. 15. Hypophosphorous acid dissolves **quinine sulphate** with a blue fluorescence. Adding potassium hypophosphite to the solution destroys the fluorescence and in sufficient amount precipitates the quinine. 16. Hypophosphites are decomposed by nearly all **acids**. 17. Hypophosphites when triturated with some **oxidizing agents**, as potassium chlorate, are apt to cause an explosion. 18. Hypophosphites are soluble in water, except ferric hypophosphite which is only sparingly soluble. Many are soluble in alcohol. [See ACIDA.]

**Acidum Lacticum.**—1. Lactic acid displaces acetic and carbonic acids from their compounds. 2. It coagulates a solution of **albumin**. 3. With **nitric acid** it forms **oxalic acid** (N. D., 70). 4. With **potassium permanganate** and sulphuric acid it gives the odor of aldehyde (U. S. P., 16). With potassium permanganate it gives pyruvic acid (M. & M., III. 110). 5. **Hydriodic acid** at once reduces lactic acid to propionic acid (Richter, 357). On mixing lactic acid and syrup of hydriodic acid together no coloration takes place at once, but after some hours the mixture becomes yellow. 6. Lactates are generally insoluble in water and alcohol. [See ACIDA.]

**Acidum Meconicum.**—1. Meconic acid, with a nearly neutral solution of a **ferric salt**, gives a red-colored solution, the color being destroyed by large excess of hydrochloric acid. 2. With a weak solution of an **ammoniated copper sulphate** it gives a green precipitate. 3. It gives a white precipitate with solutions of **lead acetate**, **silver nitrate**,

**barium chloride**, and **calcium chloride** (U. S. D. 69). 4. **Nitric acid** converts it into oxalic acid (Allen, III. part II. 337).

**Acidum Nitricum.**—1. Nitric acid is a strong oxidizing agent, and in oxidizing substances it is reduced to dinitrogen tetroxide ( $N_2O_4$ ), nitrous anhydride ( $N_2O_3$ ), nitric oxide (NO), nitrous oxide ( $N_2O$ ), nitrogen, or ammonia. 2. Nitric acid oxidizes **hypophosphites** to phosphates; 3. **sulphides** to sulphur, and then sulphates; 4. **sulphites** to sulphates; 5. **bromides** to free bromine; 6. **iodides** to free iodine, and then to iodic acid; 7. **oxalates** to carbon dioxide; 8. **citrates** to acetic and oxalic acids; 9. **mercurous compounds** to mercuric; 10. **arsenous compounds** to arsenic; 11. **ferrous compounds** to ferric. 12. Nitric acid dissolves many **metals**, while it itself is partly decomposed. 13. With concentrated **hydrochloric acid** it forms chlorine and oxychlorides of nitrogen. 14. With **carbolic acid** it forms picric acid. 15. Nitric acid reacts with **tannic acid**, giving off oxides of nitrogen. 16. With **salicylic acid** it forms nitrosalicylic acid. 17. With **alcohol** it acts violently, giving off red fumes, and forming aldehyde, acetic, formic, and carbonic acids. 18. With **creosote**, **volatile oils**, and other **organic substances** the reaction with nitric acid may be so violent as to cause explosion or ignition. 19. Nitric acid gives color reactions with many of the alkaloids. **Apo-morphine** with nitric acid gives a violet-red; 20. **brucine** a scarlet to blood-red; 21. **physostigmine**, a yellow or red; 22. **berberine**, a dark brown-red; 23. **codeine**, a yellow; 24. **hydrastine**, an orange; 25. **morphine**, an orange-red, changing to yellow. 26. Nitric acid gives a red color with **barbaloin** and **nataloin**, but not with **socaloin**. 27. Nitric acid replaces many weak acids, such as carbonic, acetic, and boric acids, when they are combined with bases. 28. Nitric acid with concentrated sulphuric acid and **glycerin** forms the explosive nitroglycerin. 29. With sulphuric acid and **cotton** or other **cellulose** it forms gun-cotton, some of the com-



pounds being explosive. 30. Nitric acid with **sugar** and heat forms oxalic acid. Very concentrated nitric acid in the cold with sugar forms an explosive compound. Dilute nitric acid oxidizes sugar to saccharic acid, while very dilute acid changes it to glucose. 31. Nitric acid with **silver** or **mercuric nitrates**, and **strong alcohol** forms the explosive fulminate of silver or mercury. 32. Dilute nitric acid, while an oxidizing agent, is not as active as the concentrated. It may not give color reactions with some of the alkaloids. 33. Fuming nitric acid is a more active oxidizing agent than the concentrated acid. When it is mixed with **organic matter**, violent explosion or ignition is liable to take place. 34. Nitrates with **sulphuric acid** give nitric acid. 35. Nitrates, particularly those of the fixed alkalies, when triturated with substances capable of being readily oxidized, are liable to explode; some of these substances are **charcoal**, **phosphorus**, **sulphur**, **sugar**, **sulphides**, **potassium cyanide**, **glycerin**, **alcohol**, and **oils**. 36. The nitrates are all soluble in water; the basic nitrates of bismuth and of mercury are insoluble. Most of the nitrates are nearly or quite insoluble in alcohol. [See ACIDA.]

**Acidum Nitrohydrochloricum.**—1. Unless very highly diluted, nitrohydrochloric acid gives a yellow coloration with **strychnine sulphate**. The products formed have not been determined. 2. Nitrohydrochloric acid is a very strong oxidizing agent, and is liable to cause violent reaction when mixed with **organic matter**. 3. It has the oxidizing properties of chlorine and the precipitating properties of hydrochloric acid. [See CHLORUM and ACIDUM HYDROCHLORICUM.]

**Acidum Nitrosum.**—1. Nitrous acid and acid solutions of nitrites, such as potassium or sodium nitrite, amyl nitrite or ethyl nitrite (in spirit of nitrous ether), all act in a similar manner. Sometimes they act as oxidizing and sometimes as reducing agents. In neutral or alkaline mixtures nitrites do not generally oxidize or reduce. 2. **Hypophos-**

**phites** form phosphoric acid and nitric oxide when mixed with acid solutions of nitrites. 3. **Sulphites** form sulphates and nitric oxide. 4. **Chlorates** form peroxide of chlorine, then hydrochloric and nitric acids. 5. **Iodides** form iodine and nitric oxide. 6. **Ammonium bromide** is decomposed by spirit of nitrous ether, liberating bromine. The other bromides are not readily affected. 7. **Mercurous salts** are reduced to metallic mercury. 8. **Mercuric salts** are not reduced (P. & J., 203). However, the author found that the spirit of nitrous ether after standing with a solution of mercuric chloride causes the formation of a white precipitate which responds to the tests of calomel. 9. **Permanganates** are reduced to manganous salts and nitric acid is formed. 10. **Chromates** are reduced to chromic salts. 11. **Gold chlorlde** is reduced to metallic gold. 12. **Hydrogen dioxide** oxidizes nitrous acid to nitric. 13. Nitrites with **sulphuric acid** and **alcohol** form ethyl nitrite. 14. Nitrous acid changes **oleic acid** to the isomeric form elaidin. 15. **Antipyrin** with acid solutions of nitrites gives the green isonitroso-antipyrin. [See ANTIPYRINUM, No. 17.] 16. **Aretanilid** gives a yellow color with acidulated solutions of nitrites. [See ACETANILIDUM, No. 1.] 17. Spirit of nitrous ether with **sodium salicylate** gives a brown-red color if allowed to stand for a day or two. 18. **Carbolic acid** with spirit of nitrous ether and water gives a yellow solution at once which begins to assume a red-brown color in five minutes and in one half hour is a deep red-brown. In a few hours it becomes turbid and deposits a solid. 19. With **tannic** or **gallic acid** or preparations containing them in large amounts, nitrites in acid solution (as an old spirit of nitrous ether) give off gaseous compounds, consisting chiefly of oxides of nitrogen. The reaction may continue for some time, and bottles containing the mixture should not be stoppered until reaction has ceased. 20. With **thymol** spirit of nitrous ether gives a green and then a brown color, changing the thymol to nitroso-thymol. 21. Spirit of nitrous ether produces a yellow color with

**morphine.** Morphine is converted into nitroso-morphine, pseudomorphine, and another base (M. & M. III. 436). 22. Spirit of nitrous ether with a tincture of **guaiaac** gives a blue color which changes to deep red in a few minutes. If the guaiaac has been exposed to the light and air for some time the blue color is not produced. 23. Nitrous acid converts **acetates** into carbon monoxide and other gases (Scoville, 223). An effervescence is frequently quite noticeable. 24. Nitrites are quite soluble in water, except silver which is only sparingly soluble. [See ACIDA and SPIRITUS AETHERIS NITROSI.]

**Acidum Oleicum.**—1. Oleic acid combines with **alkalies** to form soaps. 2. **Nitric acid** oxidizes oleic acid to acetic, propionic, butyric, valeric, adipic, azelaic, and other acids (M. & M., III. 637). 3. **Nitric acid** containing **nitrous acid fumes** or **nitrous acid** converts oleic acid into the isomeric elaidic acid, which is solid. 4. **Potassium permanganate** in alkaline mixtures gives azelaic acid and dioxystearic acids (M. & M., III. 637). 5. Concentrated **sulphuric acid** yields oxystearic acid. 6. Oleic acid combines with **bromine** to form dibromostearic acid (Allen, II. 234). 7. Iodine combines with oleic acid to form addition products. [See ACIDA.]

**Acidum Phosphoricum.**—1. Free orthophosphoric acid partially precipitates solutions of **silver nitrate** and **lead acetate**. 2. With a solution of **ferric chloride** it forms the colorless ferric phosphate, which is kept in solution by the liberated hydrochloric acid. Tannic acid or preparations containing it do not give the black color when added to this solution of ferric phosphate. 3. Orthophosphoric acid does not coagulate egg **albumin** or **gelatin** (difference from metaphosphoric acid). 4. Phosphoric acid when added to a solution of **soluble phosphate** or **soluble pyrophosphate of iron** produces a white precipitate of ferric phosphate or of pyrophosphate of iron. A large excess of the free acid redissolves the precipitate. 5. The alkali phosphates precipitate neutral

solutions of nearly all other common **metals**. The precipitate is a di- or tri-metallic phosphate, and excepting lead, mercurous, antimony, and bismuth phosphates, is generally dissolved by phosphoric acid forming mono-metallic salts. 6. The official sodium phosphate is frequently slightly alkaline and in that condition is apt to precipitate **alkaloids** from solutions of their salts. 7. **Acetic acid** transposes most of the insoluble phosphates, except those of iron, aluminum, and lead. Dilute **nitric**, **hydrochloric**, and **sulphuric acids** transpose all phosphates. 8. The di- and tri-metallic phosphates, except those of the alkalies, are insoluble in water, but many are soluble in a solution of an alkali citrate. The mono-metallic phosphates are soluble in water to some extent. Phosphates are insoluble in alcohol.

9. Metaphosphoric acid precipitates solutions of **silver nitrate**, and **lead acetate**, and **ferric chloride** (difference from orthophosphoric acid). 10. It does not cause a precipitation when it is added to a solution of the **soluble phosphate** or **pyrophosphate of iron**. 11. It coagulates solutions of **egg albumin** or **gelatin**. 12. In aqueous solution metaphosphoric acid slowly changes to orthophosphoric acid.

13. Pyrophosphoric acid precipitates solutions of **lead acetate**, **ferric chloride**, and **gelatin**. 14. The pyrophosphates of the alkalies are soluble in water, and precipitate solutions of salts of nearly all other **metals**. 15. Most of the pyrophosphates are soluble in solutions of alkali pyrophosphates as double salts. Alkali citrates also have a solvent effect. [See ACIDA.]

**Acidum Picricum.**—1. Picric acid and picrates precipitate **albumin**, **gelatin**, and most **alkaloids** from aqueous solutions of their salts. 2. Salts of picric acid explode when struck or strongly heated (Richter, 678). 3. It is explosive when rubbed or heated with readily oxidizable substances such as sulphur. [See ACIDA.]

**Acidum Salicylicum.**—1. Salicylic acid unites with **alkali hydrates** and with many **metallic oxides** to form

salts. 2. Salicylic acid liberates carbon dioxide from **carbonates**. 3. Solutions of the salicylates in water, particularly if alkaline, become colored redbrown on exposure to the **air**. This can be prevented by the addition of a small proportion of sodium thiosulphate (Allen, III. part I. 58). 4. Sodium salicylate precipitates solutions of **lead acetate** and **silver nitrate** as salicylates. 5. Salicylic acid and soluble salicylates with dilute solutions of **ferric salts** give a blue-violet to a violet-red color, depending upon the concentration. In rather acid solutions the color varies from that of the iron to brown or red. The color is destroyed by a large excess of a mineral acid or acetic acid. In nearly neutral solutions a precipitate of basic ferric salicylate is formed. 6. Sodium salicylate with **copper sulphate** gives a green solution from which the copper is not precipitated in dilute solutions by alkali hydrates. 7. **Lime water** gives a precipitate when mixed with a concentrated solution of sodium salicylate. 8. With **bismuth subnitrate** sodium salicylate in aqueous solution is said to give several compounds of bismuth and salicylic acid which have a color varying from white to red orange. The coloration, according to the author's experience, is not noticeable except after the lapse of considerable time. 9. A solution of **potassium iodide** with salicylic acid becomes yellow in one day, and after a few days it is brown and gives a test for iodine. 10. Concentrated **nitric acid** with salicylic acid gives nitrosalicylic acid; fuming nitric acid converts it into picric acid (Allen, III. part I. 52). 11. **Potassium chlorate** with hydrochloric acid converts salicylic acid into tetrachloroquinone (N. D., 89). **Chlorine** forms mono- and di-chloro-salicylic acid (M. & M., III. 680). 12. A solution of **iodine** is slowly decolorized by sodium salicylate. Iodine gives mono-, di-, and tri-iodo-salicylic acid and tri-iodo-phenol (M. & M., III. 680). 13. **Bromine water** gives a precipitate with dilute solutions of salicylates. 14. **Potassium permanganate** oxidizes salicylic acid to formic acid and carbon dioxide. 15. Sodium salicylate with **spirit of nitrous ether** gives a yellow solution

which changes to redbrown in a few hours. 16. A mixture varying from a damp powder to a liquid results when salicylic acid or sodium salicylate is rubbed with **exalgin**, **lead acetate**, **sodium phosphate**, or **urethane**. In case of lead acetate there is a strong odor of acetic acid, indicating that acetic acid is liberated. 17. Salicylic acid is said to give a soft mass when it is rubbed with **antipyrin**, but according to the author's experiments this is not the case. 18. Sodium salicylate rubbed with **antipyrin** gives a powder which becomes damp and sticky. Some say that this is due to absorption of moisture from the air, while others say that chemical reaction takes place. 19. Soluble salicylates with solutions of **quinine sulphate** give a white curdy precipitate of quinine salicylate which is nearly insoluble in water. Sodium salicylate with a dilute solution (1 : 1000) of quinine sulphate gives a crystalline precipitate in a few days. 20. **Mineral acids** and some **organic acids** liberate salicylic acid from solutions of the salicylates. Salicylic acid, being but slightly soluble, is precipitated from a not too dilute aqueous solution. 21. A concentrated aqueous solution of sodium salicylate (1 : 1) is said to be a good solvent for **volatile oils**, **resinous substances**, **carbolic acid**, **guaiacol**, **creosote**, **thymol**, **menthol**, and other bodies. 22. Salicylic acid is rendered more soluble in water by the presence of **borax**. The compound  $C_{14}H_{10}NaBO_7$  is said to be formed and deposited from strong solutions in the form of crystals, and also that the liquid soon undergoes decomposition, acquiring a bitter taste (N. D., 88). 23. Salicylic acid is rendered more soluble in water by the presence of several neutral salts, such as the citrates, acetates, and phosphates of the alkalies, by potassium nitrate, and by sodium sulphite (Allen, III. part I. 51). [See ACIDA.]

**Acidum Stearicum.**—1. Stearic acid combines with the **alkali hydrates** and **carbonates** to form stearates. 2. **Nitric acid** oxidizes it to succinic and other acids (M. & M., IV. 512). 3. **Bromine water** forms mono- and di-bromo-stearic acid (M. & M., IV. 513).

**Acidum Sulphuricum.**—1. Sulphuric acid transposes the **salts** of nearly all other acids. 2. Sulphuric acid and the soluble sulphates precipitate as sulphates solutions of salts of **lead, barium, calcium** (in concentrated solution), and **strontium**. 3. Sulphuric acid dissolves many **metals** with the evolution of hydrogen or sulphur dioxide, depending on the concentration of the acid. 4. With **hypophosphorous acid** it forms sulphurous acid and then sulphur. 5. **Hydriodic acid** with concentrated sulphuric acid forms iodine and sulphurous acid. 6. Concentrated sulphuric acid causes detonation with **chlorates**, with the evolution of the greenish-yellow chlorine peroxide. 7. With **alcohol** sulphuric acid forms ethylsulphuric acid and then ether. 8. **Water** precipitates the aromatics from the aromatic sulphuric acid. 9. The concentrated acid with most **organic matter** forms a black mass, due to the extraction of the elements of water, leaving carbon. Some organic acids, many alkaloids, and some other compounds are not thus affected. 10. Dilute sulphuric acid does not cause as many decompositions as the concentrated. 11. The sulphates of lead, barium, strontium, and calcium are nearly insoluble in water; silver and mercurous sulphates are sparingly soluble; mercuric, antimony, and bismuth are soluble in acidulated water; the others are soluble in water. Sulphates are generally insoluble in alcohol. [See ACIDA.]

**Acidum Sulphurosum.**—1. Sulphurous acid on exposure to **air** is slowly oxidized to sulphuric acid. 2. Sulphurous acid does not usually precipitate solutions of metallic salts. The soluble sulphites—potassium, sodium, and ammonium—precipitate neutral solutions of salts of nearly all other **metals**. Sometimes sulphurous acid contains sulphuric acid which may cause reaction in certain cases. 3. Sulphites and sulphurous acid give a red color with a dilute solution of **ferric chloride**. The color is soon destroyed, due to the change of the ferric sulphite to ferrous sulphate. 4. **Nitric or nitrous acid** oxidizes sulphites to sulphates. 5. **Hypophosphites** in acid solution with sulphites form phosphoric

acid and sulphur. 6. Sulphites with **chlorine**, or **chlorates** in acid solution, produce sulphuric and hydrochloric acids. 7. **Silver salts** in solution are first precipitated by sulphites and then reduced to metallic silver when warmed. 8. **Arenic compounds** are reduced to arsenous. 9. **Permanganates** in acid solution are reduced by sulphites to manganous compounds. 10. **Chromates** in acid solution are reduced to chromic salts. 11. **Mercuric** and **mercurous nitrates** are reduced to metallic mercury. **Mercuric chloride** is slowly reduced to calomel and on heating to metallic mercury; the sulphurous acid acts more quickly than the sulphites. 12. Sulphurous acid has a bleaching effect on organic **coloring matters**. 13. Sulphites are decomposed by nearly all **acids**, except carbonic, boracic, hydrocyanic, and in some instances hydrosulphuric. 14. The sulphites of the alkali metals are soluble in water; the others are insoluble or sparingly so. The sulphites are insoluble in alcohol. [See ACIDA.]

**Acidum Tannicum.**—1. An aqueous solution of tannic acid changes, forming gallic acid and probably some elagic and carbonic acids. The change is retarded or prevented by the presence of glycerin or alcohol (Caspari, 616). The solution gets darker on standing and this is hastened by alkalies. 2. Tannic acid in dilute solutions combines with the **alkali hydrates** and **carbonates** to form soluble tannates and these solutions soon become colored, varying from red to brown, green, or black. 3. **Potassium hydrate** or **carbonate** with a concentrated solution of tannic acid gives a compound which is but slightly soluble in water, but dissolves in a certain excess of alkali (U. S. D., 101). When potassium hydrate is added in excess to a solution of tannic acid tannoxylic acid or rubitannic acid is formed; if the mixture is boiled tannomelanin acid is formed (A. D., 95). 4. **Ammonia** in its reactions resembles potassium hydrate (U. S. D., 101) but the precipitate is not nearly so great unless ammonium chloride has been previously added to the ammonia.



5. **Sodium hydrate** gives little or no precipitate. 6. A small amount of **lime water** added to a solution of tannic acid gives a precipitate which redissolves; adding more lime water the precipitate is white and permanent, changing to light blue and then dark blue as more lime water is added; a very large excess of lime water gives a precipitate which is pinkish. 7. Tannic acid precipitates as tannates solutions of salts of many of the metals, especially **lead, silver, mercury, bismuth, and antimony**. 8. The alkali tannates give precipitates with solutions of salts of nearly all other **metals**. 9. With solutions of **ferric salts** tannic acid gives a solution or precipitate (depending on the concentration) of a dark blue-black to green-black color. The addition of enough of phosphoric acid to convert the iron into ferric phosphate prevents or destroys the color. Theoretically forty-five minims of 10 per cent. phosphoric acid is sufficient to convert one dram of the official tincture of ferric chloride into the phosphate. Practically it requires from one and a half to two times as much dilute acid as tincture, depending to some extent upon the amount of tannic acid, to prevent the formation of the dark tannate of iron. 10. With purely **ferrous salts** in concentrated solution (not in dilute solution) it gives a white gelatinous precipitate, which quickly becomes blue on exposure to air. Nearly all commercial samples of ferrous sulphate contain some ferric salt. 11. A strong solution of tannic acid gives precipitates with concentrated **sulphuric, hydrochloric, or phosphoric acids**. These precipitates are supposed to be compounds of tannic acid with the respective acids, and are soluble in pure water but not in acidulated water (U. S. D., 101). 12. Saturated solutions of **sodium chloride, calcium chloride, potassium acetate**, and some other **salts** precipitate tannic acid from strong solutions. Precipitated by mineral salts or acids, tannic acid loses its astringency (Br. P., 21). 13. **Potassium bichromate** gives precipitates with most tannins (M. & M., IV. 634). 14. **Potassium cyanide** gives a green coloration with a solution

of tannic acid (M. & M., IV. 634). 15. With tannic acid and water **iodine** forms hydriodic acid, which combines with part of the tannic acid and remains in solution; the oxygen of the decomposed water combines with tannic acid and forms an insoluble compound; the solution is capable of dissolving iodine; the iodine in a liquid containing an excess of tannic acid does not give a blue color with starch (U. S. D., 101). 16. **Nitric acid, chromic acid, chlorine, or bromine** oxidizes tannic acid to formic and oxalic acids (A. D., 95). 17. Tannic acid reduces **potassium permanganate**. 18. Tannic acid with **Fowler's solution** or a solution of **sodium arsenate** gives a nearly white precipitate which with the liquid turns to a dark dirty green within a day. 19. **Hydrogen dioxide water** with tannic acid shows no change at first but after a few days a light brown precipitate falls. 20. Tannic acid reduces salts of **gold, silver, mercury, and copper** (Allen, III. part I. 89). 21. Triturated with **potassium chlorate** or other substances which yield their oxygen readily, tannic acid is liable to cause an explosion. 22. With **spirit of nitrous ether, amyl nitrite, or nitrous acid** tannic acid causes a decomposition and the formation of gaseous compounds some of which are oxides of nitrogen. The solution becomes deep red. 23. Tannic acid gives precipitates with solutions of **albumin, gelatin, gluten, or starch**. 24. It precipitates as tannates nearly all **alkaloids** from aqueous or dilute alcoholic solutions of their salts; the precipitate is generally soluble in mixtures containing over fifteen to forty per cent. alcohol. The presence of some organic acids, acacia, or starch also tends to prevent the precipitation. 25. Tannic acid precipitates some **glucosides, neutral and bitter principles**. 26. It precipitates aqueous solutions of **antipyrin**. 27. Tannic acid slowly decomposes **iodoform** (U. S. D., 741). 28. All drugs containing tannic acid in large proportions will have the incompatibilities given above. Some of the drugs which contain notable quantities

of tannic acid are catechu, kino, krameria, logwood, geranium, blackberry-root bark and oak bark. [See ACIDA.]

**Acidum Tartaricum.**—1. When tartaric acid is added in excess to a rather strong solution of **potassium hydrate** or many of its salts, a crystalline precipitate of potassium bitartrate forms. 2. When tartaric acid is associated with **boric acid** it is not precipitated by potassium hydrate, even on adding acetic or hydrochloric acid (U. S. D., 104). Boric acid seems to act the part of a base with tartaric acid (Watts, I. 648). 3. Tartaric acid in excess with a strong solution of **ammonia** gives a precipitate of ammonium bitartrate. 4. Potassium tartrate or Rochelle salt gives a precipitate of potassium bitartrate on adding many **acids**, the precipitate dissolving in a large excess of a mineral acid. 5. The soluble tartrates precipitate as tartrates neutral solutions of salts of most **metals**. The precipitate is generally soluble in tartaric acid or mineral acids. Many of the tartrates form soluble compounds with the alkali hydrates, due to the formation of double tartrates. 6. Tartaric acid decomposes **potassium iodide**, forming a tartrate and hydriodic acid which is slowly decomposed, liberating iodine. 7. Under certain conditions tartrates reduce salts of **gold, silver, and platinum**; **mercuric chloride** becomes mercurous chloride. 8. **Potassium permanganate** with an alkaline solution of a tartrate is reduced to manganese dioxide, while the tartaric acid is converted into formic acid, carbon dioxide, and water. 9. **Chromates** oxidize tartaric acid to formic acid, carbon dioxide, and water (M. & M., IV. 642). 10. Tartaric acid and tartrates tend to prevent the precipitation by alkali hydrates of the oxides and hydrates of the metals aluminum, antimony, bismuth, nickel, calcium, cobalt, chromium, copper, iron, lead, and zinc. 11. Tartrates in aqueous solutions have more or less solvent effect on certain salts which ordinarily are insoluble, as calcium phosphate and barium sulphate. 12. Tartrates are transposed by mineral **acids**. 13. Tartrates of the alkali bases are soluble in water. The bitartrates of potassium and ammonium are sparingly

soluble. The manganous and ferric tartrates are soluble; calcium tartrate, sparingly soluble. The other tartrates are nearly insoluble. Tartrates are generally insoluble in alcohol. [See ACIDA.]

**Aconitina.**—1. Aqueous solutions of salts of aconitine are precipitated by **alkali hydrates**, the **carbonates** of the fixed alkalies, and by the **general alkaloidal reagents**. 2. Aconitine is decomposed by long standing or by heating with **acids**, **alkalies**, or **water**, forming benzoic acid and aconine. 3. **Nitric acid** gives a red-brown solution. 4. **Ammonia**, **amyl nitrite**, **atropine**, **caffeine**, **ether**, and **morphine** antagonize its effect on the heart and respiration; **digitalis** counteracts its heart action (Potter, 97). **Strychnine** and **scoparine** are also antagonists. [See under ALKALOIDS.]

**Adeps.**—1. Lard oxidizes on exposure to **air** and **light**, becoming acid and rancid, and in this condition liberates iodine from potassium iodide. 2. Lard is decomposed by **alkali hydrates** or **carbonates**, forming glycerin, and oleates, stearates, and palmitates of the alkalies. [See ACIDUM OLEICUM and ACIDUM STEARICUM.]

**Ether.**—1. In partly filled bottles, particularly in the presence of **water**, ether becomes acid, due to the formation of acetic acid. 2. After a few days ether with **bromine** forms ethyl bromide, bromal, and other products. 3. Hot **nitric acid** forms carbon dioxide, acetic and oxalic acids. 4. **Chromic acid** oxidizes it to acetic acid (M. & M., II. 465).

**Ether Aceticus.**—1. Ethyl acetate in the presence of **moisture** decomposes into alcohol and acetic acid. 2. With **alkaline hydroxides** it yields alcohol and an acetate of the alkali. 3. It forms chlorinated compounds with **chlorine**. 4. With **lime water** and **chlorinated lime** it yields chloroform.

**Ethyl Bromidum.**—1. Ethyl bromide is decomposed by **light** and **air**, forming alcohol, hydrobromic acid, and some free bromine (N. D., 141). 2. With **alkali hydrates** it gives ether and potassium bromide (M. & M., 480). 3. Ethyl

bromide with **ammonia** gives hydrobromate of ethylamine (Watts, II. 528).

**Æthyleni Bichloridum.**—1. Dichlorethane with water in the **sunlight** yields hydrochloric acid and acetic acid. 2. **Ammonia water** forms various ethylene amines (M. & M., II. 488).

**Æthyl Iodidum.**—1. Ethyl iodide or hydriodic ether on being exposed to **air** and **light** is decomposed with liberation of iodine (U. S. D., 1625). 2. Iodine is liberated by **chlorine**, **nitric acid**, and **sulphuric acid**. 3. **Silver nitrate** gives a precipitate of silver iodide (M. & M., II. 499).

**Airol.**—1. This oxyiodide of bismuth subgallate is slowly decomposed by **water**, particularly in the presence of **heat**, liberating iodine (Coblentz, 4).

**Albumin.**—1. The coagulability of the different albumins varies. 2. Aqueous solutions of egg albumin are precipitated by **heat** and by many **mineral acids**, as **hydrochloric**, **nitric**, and **meta-phosphoric** (not by ortho- or pyro-phosphoric acid); 3. by salts of many heavy metals, as **mercuric chloride** (prevented to a considerable extent by the presence of ammonium or sodium chloride or hydrochloric acid), **alum**, **copper sulphate**, **gold chloride**, and **ferric chloride**; 4. by some neutral salts, as **ammonium sulphate**; 5. by **hydrogen dioxide water**; 6. by some organic acids, as **tannic acid** and substances containing it (not by gallic acid), **lactic acid**, **picric acid**, **carbolic acid** (not creosote), and **trichloroacetic acid**; 7. by some organic compounds, as **alcohol** (the precipitate is redissolved by dilution with water if the albumin has not been in contact with the alcohol too long), **ether**, **collodion**, **resorcin**, **camphor**, **thymol**, **volatile oils**, and **coniine** (not nicotine).

**Alcohol.**—1. Alcohol precipitates **albumin**, **acacia**, and many **inorganic salts** from their aqueous solutions; to precipitate the acacia the resulting mixture must contain about fifty or sixty per cent. alcohol before a permanent precipitate results. 2. Strong **nitric acid** (not dilute) acts violently on alco-

hol, forming nitric oxide, nitrous ether, carbon dioxide, aldehyde, acetic and formic acids (M. & M., I. 97). 3. **Chromic acid** or a **chromate** in an acid solution oxidizes alcohol to aldehyde and acetic acid. 4. **Potassium permanganate** in acid (not in alkaline) solution oxidizes it to aldehyde and acetic acid. 5. **Chlorine** is rapidly absorbed by alcohol and in sunlight may ignite the alcohol. The ultimate product is chloral alcoholate, there being a number of intermediate products, such as hydrochloric acid, aldehyde, ethyl chloride, acetic acid, chloral, etc. (M. & M., I. 97). 6. **Bromine** forms hydrobromic acid, water, ethyl bromide, bromal, and bromal alcoholate (M. & M., I. 97). 7. **Mercuric chloride** is slowly reduced to calomel by alcohol (M. & M., I. 98). 8. **Nitric acid** with the nitrate of **mercury** or **silver** and strong alcohol forms the explosive fulminate of mercury or silver (M. & M., I. 97). 9. Concentrated **mineral acids** convert alcohol into esters and ethers. 10. Alcohol combines with many **metallic salts**, acting like water of crystallization (M. & M., I. 98). 11. With **chloral hydrate** alcohol forms chloral alcoholate which is not very soluble in elixir and less so in the presence of potassium bromide. 12. Alcohol sometimes contains traces of aldehyde or other impurities which are darkened by **alkali hydrates**. 13. The official alcoholic preparations, except those mentioned in the following classes, give precipitates when mixed with **water**, the precipitate sometimes being the active principle and sometimes inert matter: tinctures, except acetate of iron, chloride of iron, an old tincture of iodine, and deodorized tincture of opium; fluid extracts, except chestnut; spirits, except nitrous ether, ammonia, whiskey and brandy; wines, except white, red, and antimonial. 14. **Water** generally causes a precipitation, when mixed with alcoholic solutions of the following substances: free alkaloids, alkaloids combined with any of the general alkaloidal reagents, glucosides, neutral and bitter principles, salicylic, gallic, or benzoic acid, volatile oils, resins, camphors, oleoresins, or balsams. 15.

Among the many substances which alcohol generally dissolves may be mentioned acetates (except mercurous and silver), benzoates, bromides, chlorides (except potassium, sodium, ammonium, lead, silver, and mercurous), iodides (except lead, silver, and mercurous), nitrates (except potassium, lead, and bismuth), salicylates (except mercury and bismuth), deliquescent salts (except potassium carbonate), acids, alkali hydrates, alkali hypophosphites, phosphorus, sulphur, iodine, organic and inorganic acids (except arsenous), hydrocarbons and carbon derivatives, volatile oils, phenols, camphors, resins [see under RESINAE], oleoresins, balsams, alkaloids and their salts, glucosides, and neutral principles.

**Alkalies.**—The following preparations contain an alkali hydrate or carbonate: ammonia water, stronger ammonia water, bismuth and ammonium citrate, fluid extracts of glycyrrhiza and senega, saccharated carbonate of iron, ammonia liniment, lime liniment, lime water, solution of potassium hydrate, solution of sodium hydrate, solution of potassium arsenite, mass of carbonate of iron, compound iron mixture, chalk mixture; mixture of rhubarb and soda, pills of carbonate of iron, spirit of ammonia, aromatic spirit of ammonia, syrup of lime, ammoniated tincture of guaiac, ammoniated tincture of valerian, and syrup of rhubarb. [See HYDRATES, FIXED ALKALI and HYDRATE, VOLATILE ALKALI.]

**Alkaloids.**—1. Alkaloids combine with **mineral acids** and **acetic** and **citric acids** to form salts which are generally soluble in water or alcohol, but insoluble in ether, chloroform, benzol, petroleum ether, carbon bisulphide, or oils. In combination with most other **organic acids** the alkaloids form salts that are not generally soluble in water. 2. Alkaloids combined with acids and dissolved in water or very dilute alcohol are generally precipitated as free alkaloids by solutions of **alkali hydrates** or **carbonates** and by **borax**. Solutions of **potassium arsenite**, **sodium phosphate** and **sodium arsenate** are slightly alkaline and may precipitate the free alkaloid. M. Christiaens says: All salts whose reaction to

litmus is alkaline, whatever be their chemical function, precipitate the alkaloids from their salts (D. C., XXXVIII. 59). **Ammonium carbonate** and the **bicarbonates** of **potassium** and **sodium** frequently do not cause precipitation. 3. The alkaloidal salts are generally precipitated from aqueous solution, combined with the precipitant, by soluble **salicylates**, **benzoates**, **bichromates**, **iodides**, **bromides**, and by the following general alkaloidal reagents: **tannic acid**, **picric acid**, **iodine** in solution of potassium iodide, **bromine** in solution of potassium bromide, **potassium mercuric iodide** (Mayer's reagent), **potassium bismuthic iodide**, **mercuric chloride**, **platinic chloride**, **gold chloride**, and **phosphomolybdic acid**. The presence of from twenty to fifty per cent. of alcohol will nearly always prevent the precipitation. 4. In the presence of **acacia** some alkaloids are not precipitated from dilute aqueous solutions of their salts by tannic acid, potassium mercuric iodide, or sodium phosphomolybdate (Allen, I. 353). **Starch** dissolved by boiling in water has a similar effect with the potassium mercuric iodide. 5. Some alkaloidal salts are thrown out of solution by the presence of considerable quantities of very **soluble salts**, e.g., strychnine hydroiodide by potassium iodide. 6. Some alkaloids are strong reducing agents; most alkaloids are decomposed by **oxidizing agents**. 7. The free alkaloids are generally only sparingly soluble in water, except atropine, caffeine, codeine, nicotine, and coniine, but are generally soluble in alcohol, ether, or chloroform. A few are soluble in excess of solutions of fixed alkali hydrates, e.g., morphine; a few are soluble in excess of ammonia water, e.g., quinine. 8. A strong solution of **chloral hydrate** dissolves morphine, quinine, and many other alkaloids (U. S. D., 367). The solubility of the salts of the alkaloids is also increased. Dilution with water may cause a precipitation of the alkaloid.

**Aloinum.**—1. Concentrated solutions of aloin are slowly precipitated by a solution of **lead subacetate** (not the neutral lead acetate), more quickly if the mixture is heated. The



liquid is turned brown. 2. An aqueous solution of aloin with **ferric chloride** gives a green-black to a brown-black color. 3. With solutions of **alkali hydrates** aloin gives an orange to a red color, and is readily decomposed. 4. Concentrated **nitric acid** gives a red color with barbaloin or nataloin (not with socaloin), and by further action chrysammic, picric, and oxalic acids are formed. 5. **Spirit of nitrous ether** gives a red solution with aloin, even in the presence of a large amount of water.

**Alumen.**—1. Alum in solution is precipitated as aluminum hydroxide by the **alkali hydrates** and their **carbonates**, **borax**, and **lime water**. Citrates, tartrates, glycerin, sugar, and acacia tend to prevent precipitation. 2. The **alkali phosphates** give the insoluble aluminum phosphate. Citrates and tartrates tend to prevent precipitation. 3. With **tartaric acid** it gives a precipitate of potassium bitartrate. 4. **Tannic acid** causes a slight precipitation. 5. Alum is slightly acid to litmus. 6. Adding a **soluble carbonate** to a solution of alum produces an effervescence, due to the liberation of carbon dioxide. 7. Alum has the incompatibilities of the soluble sulphates. [See ACIDUM SULPHURICUM.]

**Alumini hydras.**—Aluminum hydrate, especially when freshly precipitated, removes suspended solid matter and coloring matter in solution from liquids.

**Alumnol.**—1. A solution of alumnol gives a precipitate of aluminum hydrate when treated with **alkalies**, the precipitate being soluble in excess of a fixed alkali (M. M. R., IV. 266). 3. It is precipitated by a solution of **albumin** or **gelatin**, the precipitate being soluble in excess of these substances (M. M. R., IV. 266). 3. **Silver nitrate** is decomposed by it with the separation of metallic silver (M. M. R., IV. 266).

**Ammonii Benzoas.** [See ACIDUM BENZOICUM and AMMONIUM.]

**Ammonii Bromidum.** [See ACIDUM HYDROBROMICUM and AMMONIUM.]

**Ammonii Carbonas.**—1. Ammonium carbonate with

**calomel** gives a black compound, dimercurous ammonium chloride, having the formula  $\text{NH}_2\text{Hg}_2\text{Cl}$ . 2. With a solution of **mercuric chloride** it gives a white precipitate of ammoniated mercury,  $\text{NH}_2\text{HgCl}$ . 3. It gives no precipitate with **magnesium salts**, except in concentrated solutions. 4. The precipitate with **copper** or **silver** salts is dissolved by an excess of the carbonate. 5. Ammonium carbonate does not precipitate as many of the **alkaloids** from solutions of their salts, as do the carbonates of potassium and sodium. Some of the alkaloids not precipitated are atropine, hyoscyamine (except in strong solution), nicotine, coniine, codeine, and caffeine. 6. Ammonium carbonate with **resorcin** in solution gives a red-brown solution at first which changes to deep blue in a day or two. 7. Excepting the reactions noted above, ammonium carbonate acts similarly to potassium or sodium carbonate. [See CARBONATES and AMMONIUM.]

**Ammonii Chloridum.** — 1. An aqueous solution is decomposed by **chlorine**, forming hydrochloric acid and the explosive nitrogen chloride (M. & M., 1. 202). 2. Ammonium chloride aids the solution of several salts that are more or less insoluble ordinarily. [See ACIDUM HYDROCHLORICUM and AMMONIUM.]

**Ammonii Iodidum.** — 1. Ammonium iodide very frequently contains free iodine, and it would then have the incompatibilities of iodine. [See IODUM, ACIDUM HYDRIODICUM, and AMMONIUM.]

**Ammonii Nitras.** [See ACIDUM NITRICUM and AMMONIUM.]

**Ammonii Phosphas.** [See ACIDUM PHOSPHORICUM and AMMONIUM.]

**Ammonii Valerianas.**—Ammonium valerianate, in concentrated aqueous solution with **sulphuric acid**, gives an oily layer of valerianic acid. [See AMMONIUM.]

**Ammonium.**—1. Ammonium compounds, with solutions of the **fixed alkali hydrates** or **carbonates**, or with the hydrates of **barium**, **calcium**, or **strontium**, give free am-

monia. 2. Some ammonium salts with **chlorine gas** give explosive nitrogen chloride. 3. Certain ammonium salts, such as the acetate, citrate, and chloride, in aqueous solution may act as solvents for otherwise insoluble compounds. [For ammonia water see **HYDRATE, VOLATILE ALKALI.**]

**Amyl Nitrite.**—1. Amyl nitrite is decomposed slowly by **light** and **air**, becoming acid (Allen, 1. 159). 2. With **alcohol** or alcoholic preparations, it gradually forms ethyl nitrite and amyl alcohol (U. S. P., 40). 3. With **potassium hydrate** it forms potassium nitrite and amyl alcohol (Allen, 1. 159). 4. **Belladonna, brucine, chloroform, digitalis, morphine, picrotoxin, and strychnine** are somewhat antagonistic physiologically to amyl nitrite. [See **ACIDUM NITROSUM.**]

**Amylum.**—1. Starch in aqueous solution is precipitated by **strong alcohol, tannic acid, or lead subacetate.** 2. **Iodine** with starch forms the blue-black iodide of starch. 3. With solutions containing over five per cent. of an **alkali hydrate** starch forms a soluble compound. 4. **Acids** gradually change it to dextrin. **Diastase** has a similar effect. 5. In solution starch to some extent prevents the precipitation of **alkaloids** by potassium mercuric iodide and tannic acid.

**Antimonii et Potassii Tartras.**—1. Tartar emetic in aqueous solution is precipitated by **hydrochloric, nitric, or sulphuric acid**, forming a basic chloride, nitrate, or sulphate of antimony, together with some potassium bitartrate. Tartaric acid prevents this precipitation to some extent. 2. The **alkali hydrates** or their **carbonates**, with solutions not too dilute, give a white precipitate of antimony oxide. Citrates, tartrates, glycerin, sugar, and acacia prevent precipitation. 3. **Lime water** throws down a precipitate consisting of the mixed tartrates of calcium and antimony (U. S. D., 177). 4. The salts of most **metals**, being precipitated by normal tartrates, are incompatible with tartar emetic. 5. Strong **alcohol** throws tartar emetic out of aqueous solution. 6. **Tannic acid** gives a precipitate of tannate of antimony. 7.

**Gallic acid** precipitates concentrated solutions of tartar emetic. 8. In aqueous solution **mercuric chloride** is reduced to calomel which is precipitated. 9. Solutions of **lead acetate**, **silver nitrate**, **albumin**, and **soap** give precipitates with tartar emetic. 10. **Opium**, **alcohol**, and **ether** are physiological antagonists.

**Antimonii Sulphidum.**—1. Triturated with a strong oxidizing agent, as potassium chlorate, sulphide of antimony may cause an explosion. 2. By exposure to **air** it is partially converted into an oxide (U. S. D., 182).

**Antipyrinum.**—1. Antipyrin is neutral to litmus, but forms salts with **acids** by direct addition (N. D., 227). 2. An aqueous solution with a strong solution of **sodium hydrate** gives a white precipitate. 3. With a solution or tincture of **ferric chloride** antipyrin gives a red color, and according to some writers the mixture should not be dispensed. The red color is destroyed or prevented by an excess of mineral acids or acetic acid. 4. With commercial **ferrous sulphate** it gives a red color, due to the ferric salt which is present. With strictly ferrous salt the solution is colorless. 5. A mixture of two drams of antipyrin with one ounce of simple syrup and one ounce of **syrup of ferrous iodide** (free from iodine) soon gives a red liquid and in a few hours a red precipitate. The precipitate becomes crystalline and forms comparatively large ruby-red prismatic crystals after a few days. 6. Antipyrin gives a green color with a solution of **copper sulphate**. 7. With a strong solution of antipyrin **lead subacetate** forms a precipitate. 8. In the presence of moisture **calomel** is slowly turned dark by antipyrin, but if sodium bicarbonate is mixed with it the color is changed at once. From Werner's experiments it would appear that metallic mercury, mercurous oxide, mercuric chloride, and antipyrin hydrochloride are formed, but the mercuric chloride will combine with the antipyrin in all probability (Ph. E., XVII. 196). 9. An aqueous solution of antipyrin is precipitated by a solution of **mercuric chloride** or by **Donovan's**

**solution.** 10. **Alum** and **tartar emetic** are both said to be incompatible with antipyrin, but rubbing these with antipyrin or mixing aqueous solutions produces no apparent change. 11. A dilute solution of antipyrin with **nitric acid** gives a yellow color, passing into crimson on warming. 12. A solution of **iodine** gives with a solution of antipyrin a red-brown precipitate which dissolves in an excess of antipyrin, forming a colorless solution. There is probably formed the colorless iodoantipyrin (iodopyrin) or the di-iodoantipyrin. If more iodine is added a permanent precipitate is formed which is soluble in alcohol. 13. **Bromine water** gives a precipitate which is soluble at first but remains permanent on adding more bromine. 14. Antipyrin slowly reduces **potassium permanganate**, precipitating manganese dioxide. 15. **Chromic acid** gives an orange precipitate with a strong solution of antipyrin. 16. An aqueous solution of antipyrin gives a precipitate with **tannic acid** or preparations containing it in considerable proportions, by **picric acid** and by most of the **general alkaloidal reagents**. [See under ALKALOIDS.] 17. **Spirit of nitrous ether** with antipyrin gives a green solution, and on standing green crystals are formed if the solution is concentrated. The reaction does not take place as quickly when the spirit is neutral as when it is acid, and by having a little sodium bicarbonate present the reaction may be prevented for several days or weeks. The green compound is iso-nitroso-antipyrin. The experiments of Drs. H. C. Wood and John Marshall, as well as those made by other experimenters, go to show that this compound is not a dangerous one, as Drs. Wood and Marshall gave it in doses of fifteen grains, repeated several times at intervals of an hour (D. C., XXXIII. 107). According to these investigators there is a small amount of cyanogen evolved, the quantity being so small that no danger need be apprehended. Other nitrites act similarly. 18. Crystallized **carbolic acid** when triturated with antipyrin gives an odorless liquid called phenopyrin. On mixing aqueous solutions of these two substances a turbidity

results, and an oily liquid settles to the bottom in a few hours. 19. Triturating **chloral hydrate** and antipyrin together in proper proportions forms the liquid monochloral-antipyrin, from which hypnal is made. Moderately dilute aqueous solutions of antipyrin and chloral hydrate can be mixed without separation. 20. When antipyrin and **sodium salicylate** are rubbed together a mass or liquid is formed after a time, the length of time seeming to depend on the amount of moisture in the atmosphere. It has been suggested that the simple mixture is hygroscopic (N. D., 227), but more probably a chemical reaction takes place. Rubbing with **salicylic acid** does not give a mass or liquid. 21. Antipyrin gives a liquid when it is triturated with **acetamid, bromal hydrate, chloral alcoholate, pyrocatechin, pyrogallol, resorcin, thymol, or urethane**. 22. Rubbing antipyrin and **acetanilid** together is said to produce a mass. A slight dampness, which usually quickly disappears, is produced by hard trituration. Sometimes liquefaction results, seeming to depend on the condition of the atmosphere. 23. Triturated with **bromal hydrate** or **salol** it gives a damp powder. 24. Antipyrin dissolved in **wine** causes a gradual precipitation of the coloring matter (N. D., 227). 25. Antipyrin increases the solubility of **quinine sulphate** in water, and at the same time destroys the fluorescence and prevents the green coloration which quinine gives with bromine water followed by ammonia water. 26. The solubility of **caffeine** is said to be increased by antipyrin. 27. Antipyrin is said to be incompatible with **sodium bicarbonate, ammonia water, hydrocyanic acid, arsenic, and benzoates**.

**Apomorphinæ Hydrochloridum.**—1. An aqueous solution of apomorphine hydrochloride rapidly becomes green in color; the exact change which takes place has not been determined. 2. An aqueous solution is precipitated by the **alkali hydrates** and **carbonates** and by **lime water** as the free alkaloid, white at first, but quickly turning green or black. 3. It is precipitated by **tannic acid, picric acid, and**

nearly all the **alkaloidal reagents**. [See ALKALOIDS.] 4. With a concentrated solution of **ferric chloride** it gives a red precipitate, turning black. 5. Concentrated **nitric acid** added to the crystals gives a red solution. 6. Apomorphine hydrochloride in aqueous solution reduces **iodates**, **permanganates**, and **silver nitrate**. 7. **Strychnine**, **chloral hydrate**, and **chloroform** are somewhat incompatible with it physiologically.

**Aqua.**—Water precipitates from their alcoholic solutions **oils**, many free **alkaloids** or alkaloids combined with general alkaloidal reagents, some **glucosides**, some **neutral** and **bitter principles**, **resinous** or **fatty matter**, inert **extractive matter**, and nearly all compounds which are insoluble in water.

**Aqua Ammoniae.** [See HYDRATE, VOLATILE ALKALI.]

**Aqua Amygdalæ Amaræ.** [See ACIDUM HYDROCYANICUM and OLEUM AMYGDALÆ AMARÆ.]

**Aqua Camphoræ.**—The camphor in camphor water is sometimes thrown out of solution by dissolving in the water a large amount of some **soluble salt** as potassium bromide.

**Aqua Chlori.** [See CHLORUM.]

**Aqua Cinnamomi.** [See OLEUM CINNAMOMI.]

**Aqua Creosoti.** [See CREOSOTUM.]

**Aquæ.**—The medicating or flavoring principle in some waters is thrown out of solution by dissolving certain very soluble inorganic salts in the water; e.g., camphor water gives a precipitate of camphor when potassium bromide is dissolved in it.

**Aqua Hydrogenii Dioxidii.**—1. A solution of hydrogen peroxide generally contains a free mineral acid, which has been added to aid preservation. In such a case the solution would have the incompatibilities of the acid. 2. Hydrogen dioxide slowly undergoes decomposition, liberating oxygen, and if the bottle is tightly corked a sufficient pressure may be produced to burst the bottle. 3. Hydrogen

dioxide is a strong oxidizing agent, changing **mercurous** compounds to mercuric, **ferrous** to ferric, **arsenous** to arsenic, **hypophosphites** to phosphates, and **sulphites** to sulphates. 4. It liberates sulphur from **sulphides**. 5. With reduced **iron** and water it gives a little effervescence, and in a few hours a brown precipitate of ferric hydrate or oxide. 6. **Chromic salts** in alkaline mixtures are oxidized to a chromate. A **chromate** in the presence of an acid is reduced to a chromic salt (M. & M., II. 723). 7. Caustic **alkalies** decompose hydrogen dioxide, forming oxygen and water (M. & M., II. 724). 8. **Ammonia** in solution forms ammonium nitrite (M. & M., II. 723). 9. **Iodides** are oxidized liberating iodine. 10. Bromine is liberated from **hydrobromic acid**. 11. With **chlorine** hydrogen dioxide forms hydrochloric acid and oxygen (M. & M., II. 724). 12. Hydrogen dioxide reduces **potassium permanganate** and is itself reduced; the products in a solution acidulated with sulphuric acid are manganous sulphate, potassium sulphate, water and oxygen. 13. It reduces **gold**, **silver**, **mercuric mercury**, and **platinum** from their oxides (P. & J., 212). 14. Hydrogen dioxide unites with some acids as **phosphoric**, **sulphuric**, **nitric** and **hydrochloric**, forming mixtures in which it is less easily decomposed (Watts, III. 197). 15. Reaction takes place when hydrogen dioxide water and **formic aldehyde** are mixed, producing formic acid. 16. It bleaches **litmus** and most organic colors. 17. Hydrogen dioxide slowly reacts with **alcohol**. 18. It gives a blue color with a tincture of **guaiaac** if the guaiaac has not been exposed to air and light too long. 19. With **tannic** or **gallic acid** it slowly gives off some gas and colors the solution yellow brown. 20. Hydrogen dioxide oxidizes **carbolic acid** to pyrocatechin, hydroquinone and quinone (M. & M., III. 832). A mixture of hydrogen dioxide water and carbolic acid becomes yellow to red brown in a few hours. 21. Hydrogen dioxide changes **glycerin** to oxalic acid and carbon dioxide. 22. It coagulates a solution of **albumin** (U. S. D., 214). 23. Some substances such as **ammonia**, **hydrocyanic**



**acid, tobacco, aconite**, and most narcotic substances are unaffected by it and restrain its oxidizing influence on other bodies (U. S. D., 213). 24. Quite a number of substances decompose hydrogen dioxide into water and oxygen while they themselves are not affected. Some examples of these are **manganese dioxide, sodium sulphate, potassium bromide, potassium chloride, charcoal**, and some **organic substances** (M. & M., II. 724).

**Aqua Menthæ Piperitæ.** [See OELUM MENTHÆ PIPERITÆ.]

**Aqua Pimentæ.** [See OLEUM PIMENTÆ.]

**Argenti Nitras.**—1. Silver nitrate is easily changed to the oxide or metallic silver by **light** and **organic matter**. 2. Silver nitrate in aqueous solution is precipitated as the gray-brown silver oxide by the **hydrates** of **potassium, sodium, and ammonium**, the precipitate being soluble in ammonia water. 3. The **alkali carbonates** precipitate the yellow-white silver carbonate. 4. **Hydrochloric acid** and the soluble chlorides precipitate the white silver chloride. 5. Soluble **arsenites** precipitate the yellow silver arsenite. 6. Soluble **arsenates** precipitate the red-brown silver arsenate. 7. **Sodium phosphate** precipitates the yellow silver phosphate. 8. **Borax** precipitates silver borate. 9. The soluble **bromides, iodides, and cyanides** precipitate the silver bromide, iodide, and cyanide, the iodide and cyanide being soluble in excess of the precipitant. 10. **Chromates** precipitate the red-brown silver chromate. 11. **Potassium permanganate** with not too dilute solutions of silver nitrate gives a precipitate of silver permanganate. 12. It is reduced to metallic silver by metallic **zinc, copper, tin, mercury**, and **lead**; by **hypophosphites** and **sulphites**; in alkaline mixtures, by **arsenites, manganous salts, antimonious salts**; by **ferrous sulphate** in the cold. 13. **Tannic acid** precipitates the silver tannate. 14. Soluble **citrates** give precipitates of silver citrate. 15. Soluble **salicylates** give precipitates of silver salicylate. 16. **Morphine salts** are precipitated by silver

nitrate with a red coloration. 17. Free **cocaine** gives a black precipitate, probably of silver oxide. 18. Silver nitrate in solution is reduced to the metallic condition by **glucose, volatile oils, aromatic waters, tartrates, creosote, formaldehyde**, and many other **organic substances**, but not generally by alkaloids. 19. An **alcoholic** solution of silver nitrate gradually deposits metallic silver. 20. Silver nitrate heated with **nitric acid** and **alcohol** produces the violently explosive fulminate of silver (N. D., 279). 21. Most salts of silver, except the nitrate and chlorate, are insoluble or sparingly soluble in water.

**Argenti Oxidum.**—1. Silver oxide readily parts with its oxygen, forming explosive mixtures with many substances. Triturated dry with **sulphur, sulphide of antimony, sulphide of arsenic, phosphorus, tannic acid, creosote**, and some other **organic substances**, it is liable to explode or cause ignition. 2. Moist silver oxide decomposes many metallic salts in solution, precipitating the metallic hydroxides, e.g., salts of **bismuth, copper, iron, and mercury** (M. & M., IV. 470). 3. **Iodine** in water forms silver iodide and iodic acid. 4. **Chlorine** forms silver chloride and chlorate. 5. A strong solution of silver oxide in concentrated ammonia forms the explosive silver nitride ( $\text{Ag}_3\text{N}$ ) on standing or by adding alcohol (M. & M., IV. 470).

**Aristol.**—1. Aristol is decomposed by **light** and **heat**, liberating iodine. 2. It should not be mixed with bodies having a strong affinity for iodine. **Sulphuric acid** decomposes it.

**Arseni Iodidum.**—1. Iodide of arsenic in aqueous solution decomposes into arsenous and hydriodic acids (U. S. P., 58). Iodine is also liberated. 2. Iodide of arsenic precipitates many **alkaloids** from solutions of their salts. 3. Its incompatibilities are similar to those of the soluble iodides and of arsenous acid. [See ACIDUM HYDRIODICUM and ACIDUM ARSENIOSUM.]

**Arsenates.** [See ACIDUM ARSENICUM.]

**Arsenites.** [See ACIDUM ARSENOSUM.]

**Asaprol.**—1. When a neutral solution of **quinine sulphate** or **hydrochloride** is poured suddenly into a solution of **asaprol**, there forms on the surface of the liquid a resinous body adhering to the walls of the vessel. If the **asaprol** solution is gradually poured into the **quinine** solution a precipitate forms and settles. 2. **Asaprol** being a calcium salt, has the incompatibilities of calcium salts (D. C., XXXVIII. 107). 3. A solution of **asaprol** is precipitated by **antipyrin**.

**Atropina.**—1. **Atropine** is precipitated from concentrated aqueous solutions of its salts as the free alkaloid by **alkali hydrates** and the **carbonates** of the **fixed alkalies** (not ammonium carbonate or the bicarbonates). 2. It is precipitated by the **general alkaloidal reagents**, except **platinic chloride**. [See ALKALOIDS.] 3. By continued heating with **alkali hydrates**, **acids**, or **water**, **atropine** is decomposed, forming **tropine** and **tropic acid**. 4. **Chromic acid** converts it into **benzoic acid** (M. & M., I. 362). 5. The precipitation by **gold chloride** is prevented to some extent by the presence of **sodium hyposulphite**. 6. Some of the antagonists of **atropine** are **morphine**, **pilocarpine**, **physostigmine**, **aconitine**, **chloral hydrate**, **hydrocyanic acid**, **muscarine**, **quinine**, **bromal hydrate**, and **phytolacca**.

**Auri et Sodii Chloridum.**—1. **Gold** and **sodium chloride** precipitates many of the **alkaloids** from solutions of their salts as double compounds. The addition of **sodium thiosulphate** to the **chloride** before mixing with the **alkaloidal** solution tends to prevent precipitation. If one fourth of a grain of **sodium thiosulphate** be dissolved in one dram of **water** and added to one eighth of a grain of **gold** and **sodium chloride** dissolved in one dram of **water** and this added to one eighth of a grain of **strychnine sulphate** in two drams of **water**, no precipitation will take place at once or for several days. Using one half as much **water** as above stated, a precipitate may be slowly formed. If one fourth the amount of **water** is used precipitation will usually take place within a

day. 2. **Potassium iodide** added to a solution of gold chloride (the latter being in excess) precipitates the yellow aurous iodide and liberates iodine. But if the solution of gold chloride is added to the potassium iodide solution (the latter being in excess), there is first formed a dark green solution of potassium auric iodide, then a precipitate of auric iodide which is instable, decomposing in pure water forming aurous iodide (P. & J., 154). 3. Gold chloride combines with and precipitates **albumin**. 4. Gold chloride in solution is reduced to metallic gold by metallic **silver, mercury, copper, and iron**; 5. by **mercurous salts, arsenites, ferrous sulphate**, and many **organic substances**; 6. by **hypophosphorous, sulphurous, nitrous, oxalic, and tannic acids**; 7. by **light and heat**. 8. **Atropine and morphine** are somewhat antagonistic physiologically.

**Barium.**—Barium salts in aqueous solution are precipitated by **sulphuric acid** and soluble **sulphates**, by aqueous solutions of **phosphates, tartrates, oxalates, carbonates, chromates**, or **tannic acid**, the precipitate being barium sulphate, phosphate, tartrate, oxalate, carbonate, chromate, or tannate.

**Belladonna.** [See ATROPINA.]

**Benzaldehydum.** [See OLEUM AMYGDALÆ AMARÆ.]

**Benzoates.** [See ACIDUM BENZOICUM.]

**Bismuthi et Ammonii Citras.**—1. Citrate of bismuth and ammonium in aqueous solution is precipitated as the bismuth citrate by most mineral **acids** and the stronger organic acids. 2. It is not readily precipitated by the **fixed alkali hydrates**, but these on heating liberate ammonia.

**Bismuthi Salicylas.**—1. Bismuth salicylate with a solution of a **ferric salt** gives a violet color.

**Bismuthi Subgallas.**—1. Bismuth subgallate or dermatol is decomposed by strong **acids** with liberation of gallic acid.

**Bismuthi Subnitras.**—1. Bismuth subnitrate is con-

verted into the hydrate by solutions of the **alkali hydrates**. 2. In the presence of water the **alkali carbonates** and **bicarbonates** convert it into the subcarbonate, and at the same time some carbon dioxide is liberated. 3. Soluble **iodides** change bismuth subnitrate to an iodide. [See No. 9, under ACIDUM HYDRIODICUM.] 4. **Hypophosphites** in neutral or alkaline mixtures reduce bismuth subnitrate to a form of bismuth having a quantivalence of two (P. & J., 220), a black compound being formed. 5. **Chlorine** or **chlorinated lime** in alkaline mixtures convert the bismuth into the reddish peroxide (P. & J., 90). 6. **Tannic acid** in the presence of water slowly forms the yellow tannate of bismuth. 7. With a solution of **sodium salicylate** bismuth subnitrate is said to form a series of nitro-salicylates, varying in color from white to red orange. Mixtures of these in various proportions made in the author's laboratory showed no perceptible change even on standing. 8. Bismuth subnitrate is soluble in **glycerin**, but should not be triturated with it for fear of an explosion (Scoville, 226).

**Borates.** [See ACIDUM BORICUM and SODII BORAS.]

**Bromal Hydras.**—1. Bromal hydrate is decomposed by **alkali hydrates**, forming bromoform and a formate (N. D., 352). 2. With **alcohol** it forms bromal alcoholate (M. & M., 1. 540). 3. It forms a liquid or mass when triturated with **acetamid**, **antipyrin**, **borneol**, **carbolic acid**, **euphorin**, **exalgin**, **menthol**, **pyrocatechin**, **urea**, or **urethane**. With **diuretin** or **methacetin** it gives a damp powder.

**Bromides.** [See ACIDUM HYDROBROMICUM.]

**Bromoformum.**—1. Bromoform turns yellow in the light. 2. **Potassium hydrate** converts it into a bromide and a formate of potassium. 3. With alcoholic **potash** bromoform is decomposed, producing potassium bromide, carbon monoxide, ethylene, and water (Allen, 1. 184).

**Bromum.**—1. Bromine with **alkali hydrates** forms bromides and bromates. 2. With **sulphites** it forms sulphates

and bromides. 3. With **hypophosphites** it forms phosphates and bromides. 4. Metallic **mercury** and **mercurous compounds** are oxidized to mercuric compounds. 5. **Arsenites** are converted into arsenates. 6. **Ferrous salts** are converted into ferric salts, and in alkaline mixtures into ferrates. 7. Bromine bleaches vegetable **colors**. 8. It combines with many **fixed oils** containing olein, forming addition products. 9. With oil of **turpentine** and some other **volatile oils** it is liable to react violently and may cause ignition. 10. Bromine in **water** gradually forms hydrobromic acid and oxygen (M. & M., I. 536). 11. An **alcoholic solution** is gradually decolorized, forming hydrobromic acid. 12. With **hydrogen dioxide** oxygen is evolved. 13. Bromine colors **starch paste** yellow.

**Butyl Chloral Hydras.**—1. Butyl chloral hydrate (erroneously called croton chloral hydrate) gradually undergoes decomposition in aqueous solution. 2. With **alkalies** it is decomposed, producing a formate and propylic chloroform, which splits up with the formation of a chloride of the alkali and dichloride of allylene (Allen, I. 176). 3. It liquefies or gives a soft mass when triturated dry with **acetamid**, **carbolic acid**, **exalgin**, **menthol**, **pyrocatechin**, or **urethane**. With **antipyrin**, **camphor**, or **thymol** it is said to liquefy, but a powder was obtained in each case. 4. **Picrotoxin** is said to be physiologically incompatible with it, as are **atropine**, **strychnine**, and **caffeine**.

**Cadmium.**—The soluble cadmium salts in aqueous solution are precipitated by the **alkali hydrates**, forming white cadmium hydrate; by **alkali carbonates**, forming the white cadmium carbonate; by the soluble **sulphides** and **hydrosulphuric acid**, as the yellow cadmium sulphide; by the **alkali chromates**, as the yellow cadmium chromate; by the soluble **phosphates**, as the white cadmium phosphate.

**Caffeina.**—1. Caffeine does not readily combine with **dilute acids**, although it unites with concentrated acids. The salts are easily decomposed by water, alcohol, or ether.

2. Caffeine in moderately dilute solutions is not precipitated by the **alkali hydrates** or **carbonates** or the **general alkaloidal reagents**, except **tannic acid**, **phosphomolybdic acid**, and **mercuric chloride**. 3. Warmed with alcoholic **potassium hydrate** it forms methylamine, carbon dioxide and a little ammonia (N. D., 362). 4. The solubility of caffeine is increased by the presence of sodium salicylate, sodium benzoate, or antipyrin (Extra Pharm., 89). 5. **Chloral hydrate**, **physostigma**, **opium**, and **tobacco** are somewhat antagonistic physiologically.

**Calcium.**—1. The soluble calcium salts in concentrated solutions are precipitated by the **fixed alkali hydrates** as calcium hydrate; 2. by soluble **sulphates** in not too dilute solutions as sulphate; 3. by soluble **carbonates**, **phosphates**, **oxalates**, or **tartrates** as calcium carbonate, phosphate, oxalate, or tartrate. 4. Soluble **citrates** on heating precipitate the calcium citrate.

**Calcii Bromidum.** [See CALCIUM and ACIDUM HYDROBROMICUM.]

**Calcii Carbonas.** [See CALCIUM and CARBONATES.]

**Calcii Hypophosphis.**—1. Calcium hypophosphite in aqueous solution gradually changes to calcium phosphate. 2. Excess of sugar throws calcium hypophosphite out of solution (Scoville, 227). 3. The presence of hypophosphorous acid increases its solubility in water. [See CALCIUM and ACIDUM HYPOPHOSPHOROSUM.]

**Calcii Phosphas.**—Calcium phosphate forms soluble compounds with nearly all **acids** except those which precipitate calcium salts.

**Calcii Sulphas.**—Calcium sulphate is sparingly soluble in water. [See CALCIUM and ACIDUM SULPHURICUM.]

**Calx.**—1. Lime exposed to **air** absorbs carbon dioxide and water. 2. It combines with **water** to form calcium hydrate, which has many of the properties of the fixed **alkalies**. [See CALCIUM and HYDRATES, FIXED ALKALI.]

**Calx Chlorata.**—1. Chlorinated lime contains calcium

hypochlorite which is very easily decomposed by **mineral acids** and **carbon dioxide**, liberating chlorine. 2. It converts **sugar, starch, cellulose**, and similar substances into formic acid (U. S. D., 294). 3. It acts energetically on **volatile oils**, forming chloroform (U. S. D., 294). 4. Mixed with **glycerin** it reacts violently, giving off white fumes and turning the mass brown. The ultimate products of the oxidation are oxalic acid and carbon dioxide. 5. With **organic substances** in a dry state chlorinated lime causes gradual decomposition with the development of heat, and may cause explosion. [See CHLORUM, CALCIUM, and ACIDUM HYDROCHLORICUM.]

**Calx Sulphurata.**—Sulphurated lime is decomposed by **mineral acids** and **carbon dioxide**, liberating hydrogen sulphide.

**Cambogia.**—1. Gamboge gives an orange-red solution with a solution of **sodium** or **potassium hydrate** and the color caused by the latter reagent changes to yellow brown. 2. With **ammonia water** it gives a yellow solution, changing to red and finally brown. 3. With a tincture of **iron** it gives a black-brown solution.

**Camphora.**—1. Camphor when oxidized by **nitric acid** forms camphoric acid which is insoluble in water, and camphoronic acid which is soluble (M. & M., I. 669). 2. With **chromic acid** it forms camphoronic acid (M. & M., I. 669). 3. **Potassium permanganate** in alkaline solution converts camphor into camphoric acid (M. & M., I. 669). 4. **Bromine** unites with it to form the crystallizable instable dibromide of camphor, which on heating breaks up into hydrobromic acid and monobromated camphor (Allen, II. 447). 5. **Iodine** acts on camphor, when heated, with evolution of hydriodic acid, and formation of cymene, carvacrol, laurine. and other bodies the nature of which has not been determined (R. & S., III. part v. 427). Iodine dissolved with a large excess of camphor in alcohol still gives the iodine reaction with starch after several days. 6. **Chlorine** has no action on



camphor but in the presence of alcohol it forms chlorinated compounds (M. & M., I. 669). 7. Camphor absorbs the gases of **hydrochloric acid**, **sulphur dioxide**, and **nitric peroxide**, forming colorless liquids which are decomposed on adding water (Allen, II. 446). 8. Solutions of camphor in alcohol and ether increase the solubility of **corrosive sublimate** and the presence of this salt increases the solubility of camphor in these liquids (N. D., 388). 9. Camphor when heated with **salicylic acid** on the water bath forms an oily liquid, salicylated camphor, which solidifies on cooling (N. D., 389). 10. The odor of camphor covers up the odor of **musk** and is itself overcome by that of **Tolu**, **asafoetida**, and other similar substances. 11. When camphor and a **resinous substance** are rubbed together a soft mass is formed. 12. Camphor produces a liquid or soft mass when triturated with about an equal weight of the following substances: **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **menthol**, **naphtol**, **pyrocatechin**, **pyrogallol**, **resorcin**, **salol**, **thymol**, **urethane**, **monochloracetic acid**, or **dichloracetic acid**.

**Camphora Monobromata.**—1. Monobromated camphor with **nitric acid** forms bromo-nitro-camphor and camphoric acid (M. & M., I. 670). 2. With alcoholic **potash** it forms camphor (M. & M., I. 670). 3. When triturated with **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **pyrocatechin**, **salol**, or **thymol** it gives a liquid or soft mass.

**Cannabis Indica.**—1. **Water** added to an alcoholic extract of cannabis indica causes the precipitation of a large amount of resinous matter. This resinous matter is soluble in a concentrated aqueous solution of chloral hydrate. 2. **Strychnine** is somewhat antagonistic.

**Cantharidin.**—1. Cantharidin combines with **alkalies**, forming soluble cantharidates. 2. It is precipitated from solutions by **neutral lead acetate**, **silver nitrate**, **mercuric chloride**, and **copper sulphate**.

**Carbo.**—1. Charcoal absorbs many gases, such as **ammonia**, **hydrogen sulphide**, etc. 2. When mixed with solutions it absorbs and removes from solution **tannic acid**, many **alkaloids**, many **glucosides**, and a number of **bitter** and **odorous principles**, **coloring matter**, **fusel oil**, **iodine**, and many **metallic salts** (N. D., 406). 3. When triturated with **oxidizing agents**, such as **potassium chlorate** or **potassium permanganate**, there is danger of an explosion.

**Carbonates.**—1. Carbonates are decomposed by all common **acids** except hydrosulphuric and hydrocyanic acids, and by some **metallic acid salts**, with liberation of carbon dioxide. 2. Solutions of potassium and sodium carbonates precipitate solutions of salts of all other common metals; the precipitate is a normal carbonate in case of **silver**, **mercurous mercury**, **cadmium**, **ferrous iron**, **manganese**, **barium**, **strontium**, and **calcium**; it is a hydrate in case of **tin**, **aluminum**, **ferric iron**, and **chromium**; it is an oxide in case of **antimony**; it is a basic carbonate in case of **lead**, **nickel**, **bismuth**, **copper**, **zinc**, **cobalt**, **magnesium**, and **mercuric mercury**. 3. The carbonates of the alkalies precipitate as free alkaloids the aqueous solutions of most **alkaloidal salts** and decompose a few of the **alkaloids**. 4. In the presence of water **bismuth subnitrate** liberates carbon dioxide from the alkali carbonates. 5. Ammonium carbonate causes reactions similar to potassium carbonate, except with **resorcin** and **salts of mercury**, **copper**, **silver**, and **alkaloids**. [See AMMONII CARBONAS.] 6. The carbonates of the alkalies are soluble in water. The other normal or basic carbonates are insoluble in water, although many are soluble in excess of carbon dioxide, forming bicarbonates. The carbonates are insoluble in alcohol.

7. The bicarbonates of the alkalies have about the same incompatibilities as the carbonates, although they do not precipitate as many of the alkaloidal or metallic salts. 8. The pure bicarbonates do not precipitate solutions of salts of **atropine**, **hyoscyamine**, **nicotine**, **quinine**, **quinidine**, **cocaine**, **coniine**, **codeine**, **brucine**, or **caffeine**, unless the solution be

quite concentrated or heat be applied (Sohn). 9. Pure sodium bicarbonate does not precipitate solutions of silver nitrate or barium chloride (U. S. D., 1233). 10. Sodium bicarbonate with a solution of **mercuric chloride** produces an effervescence and gives a white precipitate at first which changes to a brown or purple on standing, the change taking place more quickly when the mercury is in excess. Various oxychlorides of mercury are formed (M. & M., III. 217). 11. **Heating** the alkali bicarbonates dry or in aqueous solution changes them to some extent to the normal carbonates.

**Catechu.**—1. Catechu contains a large percentage of tannic acid. [See ACIDUM TANNICUM.] 2. Catechu-tannic acid does not precipitate solutions of tartar emetic, but an aqueous solution of the acid is precipitated by **gelatin**, **albumin**, and dilute **sulphuric acid** (U. S. D., 343). 3. Catechu-tannic acid gives a greenish-black solution or precipitate with solutions of **ferric salts**.

**Cerii Oxalas.**—1. Cerium oxalate with **alkali hydrates** slowly forms the cerium hydrate and the oxalate of the alkali. 2. It dissolves in dilute **hydrochloric acid** or dilute **sulphuric acid**, and this solution is precipitated by the alkali hydrates or carbonates.

**Chinolin.**—1. Chinolin turns a reddish-brown color on exposure to air. 2. It combines with **acids** to form salts. The salts are decomposed by fixed alkali hydrates, liberating chinolin. 3. Chinolin is precipitated by many of the **alkaloidal reagents**, such as iodine, picric acid, mercuric chloride, or potassium bichromate.

**Chloral.**—1. Chloral hydrate in aqueous solution slowly undergoes decomposition, forming traces of hydrochloric acid. 2. An aqueous solution, with **alkaline hydrates**, **alkaline carbonates**, or **borax**, produces chloroform and a formate of the base. 3. Chloral hydrate unites with **ammonia** to form chloral-ammonia (Richter, 196). Chloroform is also produced and the mixture becomes brown. 4. **Mercuric oxide** decomposes chloral, forming  $\text{COCl}_2$ , carbon monoxide, and carbon

dioxide (M. & M., II. 4). However, a mixture of these with or without water, shows no apparent change for several hours.

5. **Potassium permanganate** oxidizes it, forming chloroform, chlorine, carbon dioxide, and oxygen (M. & M., II. 4).

6. Chloral hydrate unites with **hydrocyanic acid** to form chloral-hydrocyanate (Richter, 196).

7. With **potassium cyanide** it forms dichloroacetic acid (M. & M., II. 4). If chloral hydrate and potassium cyanide are rubbed together dry in a mortar, chemical reaction takes place with almost explosive violence, and a large amount of white fumes are given off, leaving a brown mass. If the two are powdered separately and mixed lightly, the reaction is slower, but a brown mass finally results.

8. In aqueous solution with **potassium iodide** chloral hydrate slowly gives chloroform and iodine (M. & M., II. 2).

9. With **alcohol** in the presence of **water** and certain soluble salts, as potassium or sodium bromide, chloral hydrate forms chlorate alcoholate, which may separate as an oily liquid. Further addition of alcohol may cause the liquids to mix.

10. Chloral hydrate in concentrated aqueous solution is a good solvent for **resinous matter**. It also dissolves **morphine**, **quinine**, and other **alkaloids** to some extent.

11. A concentrated aqueous solution of chloral hydrate is said to be a good solvent for **starch**, and on adding iodine a cherry-red color is produced instead of the blue. Experiments made by the writer always gave the blue color.

12. Chloral hydrate when rubbed hard with **acetanilid** forms a slightly damp powder. It increases the solubility of acetanilid in water. [See ACETANILIDUM, No. 8.]

13. **Camphor** forms an unstable liquid compound when rubbed with chloral hydrate.

14. Chloral hydrate gives a product varying from a stiff mass to a liquid when triturated dry with about an equal weight of **acetamid**, **ammonol**, **borneol**, **monobromated camphor**, **carbolic acid**, **diuretin**, **euphorin**, **exalgin**, **lead acetate**, **menthol**, **methacetin**, **phenacetin**, **pyrocatechin**, **salocoll**, **salol**, **sodium phosphate**, **sulphonal**, **thymol**, **trional**, **urea**, **urethane**, **benzamid**, or **quinine sulphate**. With **antipyrin** it

gives a damp powder, which sometimes becomes liquid and sometimes dry, seeming to depend on the condition of the atmosphere. 15. The physiological antagonists are **atropine**, **brucine**, **caffeine**, **codeine**, **digitalis**, **physostigmine**, **picrotoxin**, **strychnine**, and **thebaine**.

**Chloral Alcoholate.**—1. Chloral alcoholate is decomposed by **sulphuric acid**, liberating chloral (M. & M., II. 4). 2. It liquefies or gives a soft mass when triturated with **acetamid**, **acetanilid**, **antipyrin**, **borneol**, **camphor**, **monobromated camphor**, **carbolic acid**, **diuretin**, **euphorin**, **ex-algin**, **menthol**, **methacetin**, **pyrocatechin**, **resorcin**, **salol**, **thymol**, **urea**, or **urethane**.

**Chloralimid.**—1. Chloralimid is comparatively stable, not being affected by **air**, **light**, or **moisture** (N. D., 461). 2. It is decomposed by mineral **acids**, forming the corresponding ammonium salt and chloral (M. M. R., IV. 401).

**Chloralum Formamidatum.** (Chloralamid.) — 1. Chloral formamid is decomposed by **warm water** or by **alkalies**, giving chloral hydrate and ammonium formate (N. D., 461). The chloral may be further decomposed by the alkalies into chloroform and a formate. 2. It reduces **silver nitrate**.

**Chlorates.**—1. Chlorates are liable to cause an explosion when triturated dry or heated with **sulphur**, **sulphides**, **sulphites**, **cyanides**, **thiosulphates**, **hypophosphites**, **nitrites**, **reduced iron**, **amorphous phosphorus**, **iodine**, **ammonium picrate**, **tannic acid**, or substances containing it, **gallic acid**, **carbolic acid**, **oxalic acid**, **charcoal**, **sugar**, **honey**, **glycerin**, **starch**, **lycopodium**, **salicylic acid**, **shellac**, and many other oxidizable substances. 2. Chlorates with **sulphuric acid** detonate or explode, forming chlorine peroxide and a perchlorate. 3. With **hydrochloric acid** chlorates give chlorine and oxides of chlorine. [See CHLORUM.] 4. In neutral or alkaline solutions chlorates do not usually have an oxidizing effect. 5. The metallic chlorates are soluble in water and are generally soluble in alcohol, except potassium.

**Chlorida.** [See chlorides under ACIDUM HYDROCHLORICUM.]

**Chlorum.**—1. Chlorine with a solution of a **hydrate** of a **fixed alkali** or an **alkaline earth** forms a chloride and a chlorate. If the chlorine is added short of saturation a hypochlorite is formed. 2. With **ammonia water** chlorine gives ammonium chloride and a little nitrogen, or if the ammonia is in excess a little chlorate. If chlorine is in excess explosive nitrogen chloride may be formed. 3. With some **salts** of **ammonium** chlorine is liable to form the explosive nitrogen chloride. 4. Chlorine precipitates solutions of salts of **lead**, **mercurous mercury**, and **silver** as chlorides. 5. Chlorine water after standing a while is changed to hydrochloric acid. 6. Chlorine is a strong oxidizing agent, and is itself reduced to a chloride by the agents which it oxidizes. With **iodides** it forms iodine and then iodic acid, and in the presence of an alkali a periodate. 7. With **bromides** it forms bromine and in alkaline mixtures a bromate. 8. With **hypophosphites** phosphates are formed. 9. **Sulphites** or **sulphides** are changed to sulphates. 10. **Mercurous**, **arsenous** or **ferrous compounds** are changed to mercuric, arsenic, or ferric compounds in acid or alkaline mixtures. 11. With **hydrogen dioxide** oxygen is liberated. 12. **Salicylic acid** is changed to mono- and di-chloro-salicylic acid (M. & M., III. 680). 13. **Glycerin** is converted into oxalic acid and carbon dioxide. 14. Chlorine is rapidly absorbed by **alcohol**. [See ALCOHOL, No. 5.] 15. Chlorine bleaches **indigo**, **litmus**, and other organic colors. 16. It oxidizes nearly all **organic matter**.

**Chromates.** [See ACIDUM CHROMICUM.]

**Cinchona.**—1. Cinchona contains a sufficient amount of tannic acid to make its preparations incompatible with many metallic **salts** and other compounds. [See ACIDUM TANNICUM.] 2. The tannic acid gives a color varying from brown to blackish green with solutions of **ferric salts**. 3. The cinchona alkaloids in solution form compounds with the **general alkaloidal reagents**, which compounds are nearly insol-

uble in water, but soluble in alcohol. [See ALKALOIDS and QUININA.]

**Citrates.** [See ACIDUM CITRICUM.]

**Cocaina.**—1. Cocaine is precipitated from aqueous solutions of its salts by the reagents that usually precipitate alkaloids. [See ALKALOIDS, Nos. 2 and 3.] 2. Cocaine is quite easily decomposed by strong **acids**, strong solutions of **alkali hydrates**, or by **hot water**, forming methyl alcohol, benzoic acid, and ecgonine. 3. Mixed with **calomel** in the presence of moisture cocaine hydrochloride turns the mixture gray or even black, due probably to the reduction of some of the calomel to metallic mercury, while at the same time some mercuric chloride is formed. The mercuric chloride then combines with the alkaloid to form a compound insoluble in water. The free alkaloid cocaine mixed with calomel does not readily darken, but may be made to do so by blowing the fumes of hydrochloric acid over it. 4. A solution of cocaine hydrochloride is precipitated by a solution of **chromic acid**. 5. **Alcohol, amyl nitrite, caffeine, chloral hydrate, digitalis, and morphine** are physiologically antagonistic to cocaine.

**Codeina.**—1. Codeine in aqueous solution is not precipitated by alkaline carbonates, bicarbonates, or ammonium carbonate, but is precipitated by most of the other **alkaloidal reagents**. [See ALKALOIDS, Nos. 2 and 3.] 2. Codeine in aqueous solution gives a precipitate with solutions of salts of **iron, lead, copper**, and some other **metals** (N. D., 515). This is probably due to the fact that it is quite strongly alkaline and one of the most soluble of the alkaloids. 3. With some **ammonium salts**, as ammonium chloride, codeine liberates ammonia. 4. If codeine is added to a solution of a **morphine salt** morphine is set free and usually precipitated. 5. **Nitric acid** gives a yellow solution with codeine. 6. Concentrated **sulphuric acid** with **nitric acid** or with **ferric chloride** gives a blue color with codeine (Sohn, 72).

**Colchicina.**—1. Colchicine is darkened by exposure to **light**. 2. It is precipitated from aqueous solution by most of

the **general alkaloidal reagents**, unless the solution is quite weak. 3. Colchicine is readily decomposed by strong **acids** or strong solutions of **alkalies**, forming colchiceine. 4. Most of its salts are decomposed by water (M. & M., II. 234). 5. **Nitric acid** gives a blue to a violet color, turning brown and then yellow (Sohn, 42). 6. **Acids** generally give a yellow color.

**Collodium.**—1. Collodion is gelatinized by **carbolic acid** (not by creosote). Alcohol renders the mass more fluid. 2. **Water** separates the gun-cotton. [See PYROXYLINUM.]

**Coniina.**—1. Coniine becomes yellow and resinoid on keeping and gives off ammonia (U. S. D., 441). 2. It is not precipitated by the alkali hydrates or carbonates, but is by the **general alkaloidal reagents**, except platinic chloride. [See ALKALOIDS.] 3. Coniine coagulates **albumin**. 4. It precipitates solutions of salts of **aluminum, copper, zinc, manganese, iron, and silver**; the precipitate with silver is soluble in excess of the alkaloid (U. S. D., 441). 5. It forms butyric acid when treated with most **oxidizing agents**. 6. An alcoholic solution of **iodine** with coniine gives a brown precipitate, which afterwards disappears, and the liquid becomes colorless (M. & M., II. 246). 7. Vapors of coniine coming in contact with those of **hydrochloric acid** give white fumes.

**Copaiba.**—1. Copaiba, with the **hydrates of the alkalies** or **alkaline earths**, forms saponaceous compounds, in which the resin acts the part of an acid (U. S. D., 445). 2. With one sixteenth of its weight of **magnesia** which has been dampened with water, the resin of the copaiba combines slowly to form a solid mass. A similar change is produced by **calcium hydrate** (U. S. D., 445).

**Creosotum.**—1. Creosote reduces some of the **inorganic salts**, such as salts of silver, gold, and copper, to the metallic state. 2. If mixed suddenly or triturated dry with strong **oxidizing agents**, it is liable to cause an explosion. 3. It precipitates solutions of **albumin** (not gelatin or collodion) (N. D., 547). 4. Creosote with solutions of **ferric salts** gives



a violet-blue color, changing to greenish brown, and, unless in very dilute solution, a brown precipitate is formed. An alcoholic solution of creosote with an alcoholic solution of ferric chloride gives a bluish-green color (U. S. D., 450). 5. Triturated with **silver oxide**, an explosion is liable to take place. 6. With concentrated **nitric acid** reddish fumes of the oxides of nitrogen are given off. With dilute nitric acid a brown resin is formed (U. S. D., 450). 7. With concentrated **sulphuric acid** it gives a red color, becoming black on adding more acid. 8. Creosote dissolves a large number of metallic **salts** and reduces some of them to the metallic condition (U. S. D., 451).

**Creta Præparata.** [See CALCIUM and CARBONATES.]

**Cupri Sulphas.**—1. Copper sulphate is precipitated by the **fixed alkali hydrates** as blue copper hydrate, which on standing becomes basic and black. This precipitation is more or less prevented by citrates, tartrates, salicylates, sugar, milk sugar, glycerin and other organic substances. A solution of copper sulphate and acacia is gelatinized by the alkali hydrates. 2. **Ammonia water** precipitates the cupric hydrate and in excess dissolves it, forming an intense blue solution. This solution dissolves cotton, filter paper, and other forms of cellulose. 3. **Ammonium carbonate**, like ammonia water, precipitates the copper and then redissolves it, forming a blue solution. 4. The **carbonates** of the **fixed alkalies** precipitate the copper as a basic carbonate of variable composition. 5. In neutral solutions the soluble **phosphates** give a blue-white precipitate of copper phosphate. 6. **Arsenites** in neutral solution give a green precipitate of copper arsenite. 7. Soluble **iodides** reduce and precipitate copper sulphate as cuprous iodide ( $\text{Cu}_2\text{I}_2$ ), iodine being liberated. 8. In alkaline mixtures cupric compounds are reduced to cuprous oxide by **arsenous acid**, **glucose**, and many organic substances. 9. Copper sulphate coagulates a solution of **albumin**. 10. **Tannic acid** precipitates a solution of copper sulphate, and with heat reduces the copper. 11. **Sodium salicylate**

with copper sulphate in solution gives a green color, and the copper is not precipitated from dilute solution by alkalies. 12. **Antipyrin** gives a green color to a solution of copper sulphate.

**Cyanida.** [See ACIDUM HYDROCYANICUM.]

**Decocta.**—The incompatibilities of decoctions are similar to those of infusions. [See INFUSA.]

**Digitalis.**—1. Digitalin is precipitated from solutions by **tannic acid** and **chloride of gold**, not by most of the other alkaloidal reagents (Sohn, 49). 2. With **nitric acid** digitalin gives at first a colorless solution, changing to yellow or green (Sohn, 50).

3. Digitonin is precipitated from aqueous solution by **ammonia**, **tannic acid**, or **lead acetate** (Sohn, 50).

4. All of the principles of digitalis are quite easily decomposed by strong **acids** or **alkalies**. 5. The substances that are incompatible physiologically are **aconite**, **scoparin**, **strychnine**, **muscarine**, **chloral hydrate**, and **nitroglycerin**.

**Diuretin.**—1. Sodio-theobromine salicylate in aqueous solution is strongly alkaline, and is decomposed by all **acids**, even the carbon dioxide in the air, with precipitation of theobromine (M. M. R., IV. 401). 2. Diuretin is incompatible with **bicarbonates**, **borates** and **phosphates** (M. M. R., IV. 401). 3. With a solution of **ferric chloride** it gives a blue-violet color, due to the salicylate. 4. Diuretin forms a liquid or soft mass when rubbed with **carbolic acid** or **chloral hydrate**. With **bromal hydrate**, **pyrocatechin**, **chloral alcoholate** or **pyrogallol** it gives a stiff mass which dries. 5. It has the incompatibilities of salicylic acid and theobromine. [See ACIDUM SALICYLICUM and THEOBROMINE.]

**Elaterinum.**—1. Elaterin combines with the **alkali hydrates** to form compounds soluble in water, from which solution acids precipitate the elaterin. 2. It is precipitated from alcoholic solution by **lead acetate** and **silver nitrate** (Watts, II. 373).

**Emulsa.**—Emulsions are broken up by substances which precipitate the emulsifying agent. [For emulsions made with acacia see ACACIA.]

**Ergota.**—The active principles of ergot are generally precipitated by **tannic acid**, **potassium mercuric iodide**, and some of the **general alkaloidal reagents**.

**Eucalyptol.**—Eucalyptol is oxidized to cineolic acid by **potassium permanganate** (M. & M., II. 526).

**Eugenol.** [See OLEUM CARYOPHYLLI.]

**Euphorin.** (Phenyl urethane.)—1. Euphorin liquefies when triturated with **antipyrin**. If it is first triturated with sugar, it can then be mixed with antipyrin and dispensed as a powder (M. M. R., IV. 401). 2. It makes a liquid or soft mass when rubbed with **antipyrin**, **borneol**, **bromal hydrate**, **camphor**, **monobromated camphor**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **exalgin**, **menthol**, **pyrocatechin**, **resorcin**, **salol**, **thymol** or **urethane**.

**Europhen.**—1. Europhen yields iodine to **metallic salts** (Coblentz, 37). 2. It is decomposed by **heat**, **light**, or **water**, liberating iodine (N. D., 879). 4. **Alkali hydrates** and **carbonates** decompose it. 5. It should not be combined with **starch**.

**Exalgin.** (Methyl acetanilid.)—Exalgin gives a liquid or soft mass when triturated dry with **bromal hydrate**, **butyl chloral hydrate**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **menthol**, **naphtol**, **pyrocatechin**, **pyrogallol**, **resorcin**, **salicylic acid**, **salol**, **thymol** or **urethane**.

**Ferropyrin.**—**Alkali hydrates**, **carbonates**, or **bicarbonates** precipitate ferric hydrate from solutions of ferropyrin (Coblentz, 37).

**Ferri Phosphas Solubilis.**—1. The soluble phosphate of iron, being made by mixing solutions of ferric citrate and sodium phosphate, is perhaps a mixture of ferric phosphate and sodium citrate, or it is more probably a sodio-ferric citro-phosphate. When a dilute **mineral acid** other than metaphosphoric acid is added the sodium citrate or the sodio-

ferric citro-phosphate is broken up and the ferric phosphate is precipitated. Strong mineral acids may redissolve the precipitate. Metaphosphoric (glacial phosphoric) acid free from orthophosphoric acid does not cause precipitation. 2. In aqueous solution the soluble phosphate of iron is precipitated by **sodium** or **potassium hydrate** as ferric hydrate. **Ammonium hydrate** gives a reddish color, but no precipitate. [See FERRICUM and ACIDUM PHOSPHORICUM.]

**Ferri Pyrophosphas Solubilis.**—1. The soluble pyrophosphate of iron is a mixture or compound similar to the soluble phosphate of iron, and on adding a dilute **mineral acid** the ferric pyrophosphate is thrown out of solution. Strong solutions of mineral acids may redissolve the precipitate. Metaphosphoric acid free from orthophosphoric acid does not cause precipitation. 2. The red-brown ferric hydrate is precipitated from aqueous solutions by **potassium** or **sodium hydrate**. 3. **Ammonium hydrate** turns the solution red, but does not cause precipitation. [See FERRICUM and pyrophosphoric acid under ACIDUM PHOSPHORICUM.]

**Ferrosium.**—1. Ferrous salts are quite quickly changed to basic ferric compounds on being exposed to the **air**. Sugar, glycerin, and organic matter in general retard the oxidation. 2. Ferrous salts in aqueous solution are precipitated to some extent by the **alkali hydrates** as the white ferrous hydrate, quickly changing to the ferroso-ferric hydrate, which is of a dirty green to a black color. This precipitate ultimately oxidizes to a ferric hydrate or oxide. Ammonium chloride or sulphate, soluble citrates or tartrates, sugar, glycerin and many organic compounds, dissolve the ferrous hydrate or prevent the precipitation. 3. The soluble **carbonates** precipitate the ferrous carbonate, white if purely ferrous, but quickly becoming green and ultimately brown, due to the formation of a ferric compound. 4. The soluble **phosphates** precipitate the white or bluish-white ferrous phosphate. 5. With nearly neutral solutions **borax** gives a white precipitate. 6. The soluble **sulphides** (not hydrogen sulphide)

precipitate the black ferrous sulphide. 7. **Ferrocyanides** precipitate the light blue ferrous ferrocyanide. 8. **Ferricyanides** precipitate the dark blue ferrous ferricyanide. 9. **Tannic acid** with strong solutions of ferrous salts precipitates the white gelatinous ferrous tannate. This quickly oxidizes, forming the nearly black ferric tannate. Ferrous salts usually contain enough of a ferric salt to give the dark color at once. 10. **Gallic acid** with a concentrated solution of a ferrous salt gives a white precipitate which soon turns dark, due to the oxidation of the iron and formation of the ferric gallate. 11. Ferrous salts in solution are oxidized to ferric compounds by salts of **gold** or **silver**, by **hydrogen dioxide**, **chromates**, **permanganates**, **nitrous** or **nitric acid**, **chlorine** or **chlorates** in acid solution, **bromine** or **bromates** in acid solution, **iodates** in acid mixture, **mercuric compounds** in alkaline mixture, **arsenates** in alkaline mixtures, and by oxygen of the **air**. 12. The **alkaline citrates** in solution modify the astringent effects of ferrous salts, and dissolve many of the salts not soluble in water.

**Ferricum.**—1. Ferric salts are precipitated from their aqueous solutions by the alkali **hydrates** and **carbonates** as the red-brown ferric hydrate. This precipitation is more or less prevented by the presence of sugar, glycerin, citrates, tartrates, and other organic compounds. 2. When the insoluble carbonates of **barium**, **calcium**, **magnesium**, and **copper** are added to solutions of ferric salts the ferric hydrate is precipitated, the base added combining with the acid of the ferric salt. 3. **Borax** with solutions of ferric salts gives an insoluble basic borate (Watts, I. 530). Sugar, glycerin, citrates, and tartrates prevent or retard precipitation. 4. Solutions of the **alkali phosphates** precipitate from neutral solutions of ferric salts the white ferric phosphate, the precipitation being prevented by citrates, tartrates, and considerable excess of free acids. 5. The **alkali sulphides** precipitate the black ferrous sulphide after reducing the ferric compound to ferrous and liberating sulphur. **Hydrogen**

**sulphide** reduces ferric to ferrous and liberates sulphur but causes no precipitation of iron. 6. Soluble **cyanides** precipitate the neutral solutions of ferric salts as ferric hydrate with evolution of hydrocyanic acid. 7. **Ferrocyanides** with ferric salts give the blue precipitate of ferric ferrocyanide (Prussian blue); this is prevented to some extent by citrates in neutral solutions. 8. **Ferricyanides** give a brown solution with ferric salts. 9. With solutions of ferric salts **sulphites** give a red solution of ferric sulphite, which changes on heating or standing to ferrous sulphate and the solution becomes nearly colorless. 10. **Phosphoric acid** in excess decolorizes a solution of ferric chloride by forming the colorless ferric phosphate. 11. In neutral solutions the alkali **hypophosphites** precipitate ferric salts as ferric hypophosphite, but in acid solutions the iron is reduced to the ferrous condition and the hypophosphite is oxidized to a phosphate. 12. **Hydriodic acid** and soluble **iodides** with a mineral acid reduce ferric compounds to ferrous, iodine being liberated and precipitated if the iodide is entirely decomposed. 13. **Arsenites** give precipitates of basic ferric arsenite with solutions of ferric salts if they are not too strongly acid. The basic ferric arsenite is changed to some extent to a ferrous arsenate (P. & J., 118). 14. The official **tannic acid** gives a blue-black solution or precipitate of ferric tannate. Phosphoric acid in excess destroys the color by breaking up the compound and forming the colorless ferric phosphate. Some tannic acids give a green-black color. With the exception of gentian, quassia, columbo, American columbo, chiretta, and canella nearly all drugs contain tannin. 15. **Gallic acid** gives a blue-black color with a solution of ferric chloride. [See ACIDUM GALLICUM, No. 7.] 16. **Acetates** give a deep dull red liquid with nearly neutral solutions of ferric salts, due to the formation of ferric acetate. This solution on heating throws down a precipitate of basic ferric acetate. **Acetic acid** does not increase the color of a solution of ferric chloride unless the iron solution is quite highly diluted. 17. Soluble

**benzoates** precipitate nearly neutral solutions of ferric salts as ferric benzoate which is flesh-colored. The presence of an excess of free acid or of alkali tartrate interferes or prevents the precipitation. 18. With solutions of the **salicylates** ferric salts give a blue-violet to violet-red solution; the color is destroyed by a large excess of a mineral acid. In concentrated or neutral solutions ferric salicylate may be precipitated. 19. **Carbolic acid** with concentrated solutions of ferric chloride gives but little increase in color. On diluting with water the solution becomes green and more water changes it to violet blue. 20. In dilute aqueous solutions **creosote** or **guaiacol** gives with ferric chloride a violet-blue color which soon changes to green brown. An alcoholic solution of ferric chloride with creosote gives blue green. 21. **Acetanilid** with an alcoholic solution of ferric chloride gives a red color. With an aqueous solution it gives no color unless heated, and then the color fades on cooling. If the solution is heated for several minutes the color is changed to a permanent green. 22. **Antipyrin** gives a red color with a solution of a ferric salt. [See ANTIPYRINUM, No. 3.] 23. **Phenacetin** with a tincture of ferric chloride gives a deep red solution. 24. With **pyrocatechin** a solution of ferric chloride gives a green color; 25. with **pyrogallol** it gives a red; 26. and with **resorcin**, a violet. 27. An alcoholic solution of **salol** gives a violet color with a tincture of iron, but when sufficient water is added the color is destroyed and the salol precipitated. 28. Oil of **wintergreen** gives a violet color with an alcoholic solution of ferric chloride; 29. oils of **cloves**, **bay**, and **pimenta** give a blue to a green; 30. oil of **cinnamon** gives a brown; 31. oil of **thyme** gives a green brown, changing to red. 32. An alcoholic solution of ferric chloride gives a dark brown-green color with **podophyllin**; 33. with **aloin** it gives a green black to a brown black; 34. with **benzoin**, a brown to green; 35. with **gamboge**, a black brown; 36. with **asafœtida** or **storax**, a green brown; 37. with **myrrh**, a red brown; 38. with **guaiac**, a blue to brown;

39. with **balsam of Peru**, a green black; 40. with **balsam of Tolu**, a brown; 41. and with **shellac**, a black. 42. With a nearly neutral aqueous solution of ferric chloride **morphine** gives a blue to green solution, and with **apomorphine** it gives a red changing to a black. 43. Solutions of ferric salts gelatinize mucilage of **acacia**. [See ACACIA, No. 2.] 44. They coagulate solutions of **albumin**.

**Ferrum Reductum.**—1. Reduced iron combines with **acids** to form salts. 2. It is oxidized by moist **air**. 3. In the presence of water it reduces to the metallic condition salts of **copper**, **bismuth**, **lead**, **silver**, **mercury**, and **antimony**. 4. Triturated dry with strong oxidizing agents, such as **potassium permanganate** or **potassium chlorate**, it is liable to cause an explosion. 5. In the presence of water iron forms ferrous iodide with **iodine**, and ferrous bromide with **bromine**. 6. Iron is slowly oxidized to a hydrate by **hydrogen dioxide** water.

**Formaldehydum.** (Formalin).—1. Formic aldehyde in solution slowly deposits the solid crystalline paraformaldehyde which is a condensation product, consisting of three molecules of formaldehyde and which is decomposed by high heat changing back to formaldehyde. 2. Formic aldehyde with dilute solutions of the hydrates of the **fixed alkalies** and **alkaline earths** is converted into methylenenitan and formose (Richter, 192). Alkalies convert formaldehyde into methyl alcohol and a formate of the base (Wade, 73). Formaldehyde neutralizes alkalies but does not form true salts (W. D., XXI. 109). 3. **Ammonia** unites to form hexamethylenamine (Richter, 192). 4. **Hydrogen sulphide** precipitates it as trithiomethylene (Richter, 192). 5. **Hydrogen dioxide water** oxidizes formic aldehyde to formic acid. 6. Formaldehyde is a strong reducing agent, reducing salts of **gold** and alkaline solutions of salts of **silver** and **copper**. 7. It coagulates solutions of **gelatin** and renders the gelatin insoluble in water or alkalies. 8. With alkaline **bisulphites** it is said to be incompatible (M. M. R., IV. 401).



**Galla.** [See ACIDUM TANNICUM.]

**Gallates.** [See ACIDUM GALLICUM.]

**Gelatinum.**—1. Solutions of gelatin are coagulated by **tannic acid**, **picric acid**, **metaphosphoric acid**, **chlorine water**, **mercuric chloride**, **platinum chloride**, **alumnol**, **alcohol**, or **formaldehyde**. Aqueous solutions are not precipitated by **alum**, **lead acetate**, **ferric chloride**, **dilute acids**, or **dilute alkalis**. 2. **Heating** an aqueous solution of gelatin for some time renders it incapable of gelatinizing.

**Glonoinum.**—1. Nitroglycerin explodes violently on **percussion**. 2. When impure it gradually decomposes, forming **glyceric**, **oxalic**, and **nitrous acids** and the gases formed may burst the container (M. & M., II. 619). 3. **Alkalies** or their **carbonates** decompose it when dissolved in **alcohol**, forming a **nitrite**, **nitrate**, **acetate**, **oxalate**, and **formate** (M. & M., II. 619). Alkalies convert it into **glycerin** and a **nitrate** of the base (Richter, 454).

**Glucosides.**—1. Glucosides are decomposed by prolonged contact with **mineral acids**, **alkalies**, **hot water**, or **ferments**. Some glucosides may be decomposed by one of these agents, others by two or more of them. One of the products formed is **glucose**. 2. **Tannic acid** or **lead subacetate** generally precipitates the glucosides from their aqueous solutions. 3. The glucosides are not usually precipitated by the **alkali hydrates** or **carbonates** or by many of the general **alkaloidal reagents**. 4. Many of them give color reactions resembling those produced by the **alkaloids**.

**Glycerinum.**—1. Glycerin with **borax** forms **glycerol borate** and **sodium metaborate**. The **glycerol borate** is decomposed by **water**, forming **boric acid** and **glycerin**. In consequence of the formation of free acid, this mixture is incompatible with **carbonates**, but generally compatible with solutions of **alkaloidal salts** where **borax** alone would cause a precipitation. **Glucose**, **honey**, and some other organic compounds act like **glycerin**. 2. Strong **nitric acid** mixed with concentrated **sulphuric acid** converts **glycerin** into the explo-

sive nitroglycerin. When glycerin is carefully treated with nitric acid, it is converted into a mixture of oxalic acid, glyceric acid, and other organic acids (Allen, II. 278). Warming glycerin with dilute nitric acid may cause a violent reaction. 3. Gently heated with solid **potassium hydrate** glycerin is converted into potassium acetate and formate (Allen, II. 278). 4. In dilute solutions **potassium permanganate** changes glycerin to formic, propionic, and tartronic acids (M. & M., II. 618). In a strongly alkaline solution oxalic acid and carbon dioxide are formed (Allen, II. 278). Manganese dioxide is precipitated. 5. Oxidizing agents, as **chromates**, **chlorinated lime**, **nitrohydrochloric acid**, **hydrogen dioxide**, or **manganese dioxide** with hydrochloric acid, convert glycerin into oxalic acid and carbon dioxide. When glycerin is rubbed with the dry **oxidizing agents** explosion is liable to take place. 6. Concentrated **sulphuric acid** with glycerin forms acrolein. 7. Glycerin may be made to combine with several organic and inorganic acids (U. S. D., 654). 8. Glycerin dissolves **alkalies**, **alkaline earths**, and many **metallic oxides**, forming in all probability compounds similar to alcoholates (Richter, 453). 9. Glycerin prevents to some extent the precipitation, by alkali hydrates and carbonates, of solutions of salts of **lead**, **copper**, **antimony**, **aluminum**, **chromium**, **iron**, **zinc**, and **magnesium**. 10. It dissolves most deliquescent salts and increases the solubility of many inorganic and organic salts. 11. Glycerin sometimes precipitates **alkaloidal salts** from their aqueous or acidulated solutions (U. S. D., 653). 12. With most **fixed oils** it does not mix to form clear solutions. 13. Glycerin is sometimes contaminated with iron from the container, and this may give a color with carbolic acid, tannic acid, and other substances.

**Glyceritum Boroglycerini.**—Glycerite of boroglycerin is decomposed by **water** and the boric acid liberated may be precipitated.

**Glycyrrhizinum Ammoniatum.**—1. Ammoniated glycyrrhizin in aqueous solution is decomposed and the glycyrrhizic acid precipitated by **mineral acids**; the taste is changed from sweet to somewhat bitter. 2. With solutions of salts of many of the **heavy metals** it gives voluminous precipitates (N. D., 789). 3. **Fixed alkalies** liberate ammonia from it.

**Guaiaci Resina.**—1. An alcoholic solution of the fresh resin of guaiac is colored blue by **nitric acid, chromic acid, chlorine, potassium ferricyanide, potassium permanganate, ferric chloride, gold chloride, ozone, spirit of nitrous ether,** and other **oxidizing agents**. This is due to the action on the guaiaconic acid. With an excess of the oxidizing agent the color is changed to green and then red. Continued exposure to light or heat deprives the guaiac of the property of being colored blue by oxidizing agents. 2. Both the resin and the tincture turn green in the **light**. 3. **Sulphuric acid** dissolves it, forming a red solution with a tinge of blue. 4. Either in substance or in tincture, guaiac gives a blue color with mucilage of **acacia**.

**Guaiacolum.**—1. The incompatibilities of guaiacol are similar to creosote. [See CREOSOTUM.] 2. It combines with some **acids** to form crystalline compounds. 3. With **ferric chloride** it gives at first a blue color, changing to green on adding more ferric chloride. 4. It reduces a few salts, as **gold chloride** and **silver nitrate**, to the metallic condition.

**Homatropina.**—The incompatibilities are similar to atropine. [See ATROPINA.]

**Hydrargyri Chloridum Corrosivum.**—1. Mercuric chloride in aqueous solution is precipitated by solutions of **fixed alkali hydrates** or **lime water**. The precipitate is the orange-yellow mercuric oxide if the hydrate is in excess, or if the mercuric salt is in excess it will be the red-brown basic chloride of mercury. The precipitation is prevented to some extent by the presence of citrates, tartrates, glycerin, sugar, and acacia although there may form a steel-

gray precipitate in a few days. 2. **Ammonium hydrate** gives the "white precipitate," or "ammoniated mercury," the nitrogen dihydrogen mercuric chloride. 3. **Ammonium carbonate** acts like ammonium hydrate. 4. **Potassium carbonate** or **sodium carbonate** precipitates solutions of mercuric chloride as the red-brown oxychloride, which by excess of the carbonate with heat is converted into the yellow mercuric oxide. Citrates, tartrates, glycerin, acacia, and sugar prevent the precipitation to some extent. 5. A solution of mercuric chloride with **sodium** or **potassium bicarbonate** gives an effervescence and a white precipitate. If the mercuric salt is in excess the precipitate turns to a purplish red in a few hours. If the bicarbonate is in excess the precipitate remains white for some time but may ultimately change to the purplish red. Various oxychlorides are formed (M. & M., III. 217). 6. **Borax** precipitates the red-brown basic mercuric chloride (Watts, I. 641). 7. **Hydrogen sulphide** and the **alkali sulphides** with solutions of mercuric chloride give mercuric sulphide. The precipitate first formed is white and consists of the union of mercuric chloride and mercuric sulphide; by further addition of the precipitating agent the black mercuric sulphide is formed (P. & J., 110). 8. The soluble **iodides** precipitate solutions of mercuric chloride as mercuric iodide, first reddish yellow, becoming red. This precipitate dissolves in excess of the soluble iodide or excess of mercuric chloride, forming double compounds. If potassium iodide has been used in excess, the double compound is approximately represented by the formula  $(KI)_2HgI_2$ . A solution of this double salt is known as "Mayer's reagent" and precipitates nearly all alkaloids from solutions of their salts; the presence of alcohol prevents this precipitation to some extent. 9. The soluble **bromides** precipitate from concentrated solutions of mercuric salts the white mercuric bromide, which is soluble in excess of the soluble bromide or in excess of the mercuric salt (P. & J., 110). Ordinarily no trouble is experienced in combining these. 10. Soluble

**phosphates** precipitate from neutral solutions of mercuric chloride the white mercuric phosphate. 11. Mercuric chloride combines with the **chlorides** of the alkalies to form double compounds. 12. **Hypophosphorous acid** and **hypophosphites** reduce mercuric chloride to mercurous chloride and finally to metallic mercury. 13. **Sulphurous acid** and soluble **sulphites** reduce mercuric chloride to mercurous chloride. 14. **Thiosulphates** added to a solution of mercuric chloride give a white precipitate, then yellow, then black. The black precipitate is sulphide of mercury. 15. Mercuric chloride is reduced by metallic **copper, zinc, or iron**, in the presence of water, to calomel, and then metallic mercury. 16. **Arsenites** in alkaline mixtures reduce mercuric chloride to calomel and then metallic mercury, and are changed to arsenates. 17. **Tartar emetic** reduces corrosive sublimate and precipitates it as calomel; in alkaline mixtures metallic mercury is formed. 18. **Ferrous compounds** in alkaline mixtures with mercuric compounds are oxidized to ferric compounds, and reduce mercuric to mercurous. 19. If an aqueous solution of mercuric chloride is exposed to **light**, hydrochloric acid is gradually liberated and calomel precipitated (N. D., 821). 20. **Alcohol** slowly reduces mercuric chloride to calomel (M. & M., I. 98). 21. According to some writers corrosive sublimate is slowly reduced to calomel by **compound syrup of sarsaparilla** and by **honey** but not by pure syrup; the precipitation is retarded by sodium chloride (U. S. D., 689). 22. A solution of **albumin** is coagulated by mercuric chloride; this is prevented by the presence of sodium or ammonium chloride. 23. Mercuric chloride precipitates from concentrated aqueous solutions nearly all **alkaloidal salts**, some **neutral** and **bitter principles**, some **glucosides**, **antipyrin**, **tannic acid**, **vegetable extractive matter**, and **gelatin**.

**Hydrargyri Chloridum Mite.**—1. Calomel is changed to the black mercurous oxide by a solution of the **hydrates** of **potassium, sodium, calcium, or barium**. 2. Solutions of

the **carbonates** of the **fixed alkalies** convert calomel into a black mass, which is probably a mixture of the basic carbonate and oxide. 3. Calomel with **ammonia water** forms the black compound, nitrogen dihydrogen dimercurous chloride. 4. **Ammonium carbonate** acts like ammonia water. 5. The soluble **iodides** in the presence of water convert calomel into yellow mercurous iodide, which is further decomposed by an excess of the soluble iodide, forming metallic mercury and mercuric iodide. This mercuric iodide combines with the soluble iodide to form a double compound which is soluble in water. The presence of a little metallic mercury gives a green color with mercurous iodide. The color becomes more gray or black as the proportion of metallic mercury increases and the mercurous iodide decreases. 6. Soluble **bromides** act similarly to soluble iodides. 7. According to M. Mialhe, calomel is in part converted into corrosive sublimate and metallic mercury by **ammonium, potassium, or sodium chloride** at the temperature of the body (U. S. D., 695). A number of other experimenters call attention to the decomposition. (See Watts, III. 896. D. C., XLIII. 176. Proceedings Kansas Pharm. Assoc. for 1897.) The change seems to be more marked in the presence of gastric juice or pancreatin. O. H. Tansy (in Pharm. Rundschau) has made experiments to prove the fallacy of the belief that sodium chloride and calomel are incompatible. Diekman (in Ph. Era, XXII. 7) made experiments showing that the amount of mercuric chloride formed in the test tube is not over six tenths per cent. of the calomel taken, and consequently not enough to explain the increased action which the mixture sometimes seems to have. Prof. Pouchet claims that if sodium chloride is capable of converting calomel then it will be necessary to eliminate all of the sodium chloride in the system before giving a dose of calomel. Numerous other experimenters lend their support to the belief that no change, or but very little, takes place, and some bring forward clinical results to prove their point. One writer says that the exaggeration of

the toxic effect of calomel, after ingestion of salt or organic acids, arises from the fact that its combination with albuminoid substances in the stomach is facilitated and will yield products much more soluble, so that calomel will be absorbed in larger amounts.

8. **Hydrocyanic acid** and soluble **cyanides** in aqueous solution convert calomel into metallic mercury and mercuric cyanide and chloride.

9. **Bicarbonate of sodium** with calomel produces corrosive sublimate very slowly; the change does not take place within four to six weeks ordinarily (Scoville, 229). Whether any change takes place or not, calomel is more frequently given with sodium bicarbonate than without it.

10. Calomel with **alkali sulphites** in solution separates metallic mercury, and a double sulphite of the alkali and mercury goes into solution (M. & M., III. 216).

11. Solutions of **hydrogen sulphide** or **alkali sulphides** convert calomel into the black mercurous sulphide.

12. **Iodine** changes calomel into mercuric chloride and mercuric iodide in the presence of water or alcohol.

13. A mixture of **iodoform** and calomel exposed to light gives red mercuric iodide and the odor of iodoform is lost.

14. Exposed to **sunlight** calomel darkens, due to the separation of metallic mercury; mercuric chloride is also formed.

15. Calomel is said to be changed to metallic mercury and mercuric chloride by heavy trituration.

16. Boiling **hydrochloric acid** converts calomel into mercuric chloride and metallic mercury; if dilute hydrochloric acid is used, no metallic mercury will be separated (M. & M., III. 216).

17. Calomel is reduced to metallic mercury by **nitrous acid**, **spirit of nitrous ether**, **hypophosphorous acid**, and in alkaline mixtures by **arsenites** and **tartar emetic**.

18. Mercurous chloride is oxidized to mercuric compounds by **nitric** and **nitrohydrochloric acids**, **chlorine**, **bromine**, **iodine**, **hydrogen dioxide**, and in alkaline mixtures by **silver salts**.

19. **Soap** is generally alkaline and darkens calomel, probably forming an oxide.

20. Calomel in the presence of moisture is darkened by certain alkaloids, such as **cocaine** or **pilocar-**

pine. The darkening is due to the formation of metallic mercury, while at the same time some mercuric chloride is formed, which combines with the alkaloid. 21. Calomel is slowly turned dark in the presence of moisture by **antipyrin**, but at once when sodium bicarbonate is mixed with it. Metallic mercury and a mercuric compound is formed. 22. Calomel is said to be changed to metallic mercury and mercuric chloride by **cane-sugar** even in the absence of moisture. Considerable time is required for the change. **Milk-sugar** gives the reaction more quickly. **Acacia** and **tragacanth** have similar properties but in a lesser degree.

**Hydrargyri Cyanidum.**—Mercuric cyanide, so far as the base is concerned, has incompatibilities similar to mercuric chloride, except that aqueous solutions are not precipitated by alkali hydrates or iodides on account of the formation of soluble double compounds. [See HYDRARGYRI CHLORIDUM CORROSIVUM and ACIDUM HYDROCYANICUM.]

**Hydrargyri Iodidum Flavum.**—1. Mercurous iodide is rapidly darkened by the **light**, particularly in the presence of **moisture**. The darkening is in proportion to the decomposition into mercuric iodide and mercury. 2. With solutions of **iodides** mercurous iodide is decomposed, forming mercuric iodide and mercury. [See HYDRARGYRI CHLORIDUM MITE, No. 5.] 3. Mercurous iodide is reduced and oxidized by the same reagents that reduce and oxidize calomel.

**Hydrargyri Iodidum Rubrum.**—1. Mercuric iodide is decomposed by solutions of fixed **alkali hydrates**, forming the yellow mercuric oxide and a soluble double iodide of the alkali and mercury. 2. **Lime, sodium carbonate, and potassium carbonate** do not decompose mercuric iodide in the presence of water, but do in the presence of alcohol (M. & M., III. 220). 3. With soluble **iodides** it forms soluble double compounds. 4. The incompatibilities are quite similar to those of mercuric chloride. 5. A solution of **sodium thiosulphate** dissolves mercuric iodide.

**Hydrargyri Oxidum Flavum.**—1. Mercuric oxide



combines with most **acids** to form salts. 2. With **mercuric chloride** in solution it forms the red-brown oxychloride. 3. Mercuric oxide darkens in the **light**, forming mercury and oxygen (M. & M., III. 222). 4. Mercuric oxide precipitates bases from solutions of their chlorides but not from oxysalts (M. & M., III. 909).

**Hydrargyri Subsulphas Flavus.**—1. Turpeth mineral dissolves readily in **sulphuric, nitric, or hydrochloric acid**. 2. Solutions of **fixed alkali hydrates** decompose turpeth mineral, forming mercuric oxide and the sulphate of the alkali.

**Hydrargyrum Ammoniatum.**—1. White precipitate is decomposed by solutions of the **fixed alkali hydrates** or **lime water**, liberating ammonia and forming the yellow mercurous-ammonium chloride (M. & M., III. 208). 2. Water decomposes it slowly, forming mercurous-ammonium chloride and ammonium chloride (M. & M., III. 208). 3. When ammoniated mercury is triturated with **iodine**, the mixture will puff up after a time from the spontaneous decomposition of nitrogen iodide formed in it; but in the presence of alcohol the decomposition takes place suddenly and with violent explosion (N. D., 847). 4. **Bromine** or **chlorine** causes the evolution of hydrogen and the formation of mercuric bromide or mercuric chloride (M. & M., III. 208). 5. Ammoniated mercury is dissolved by a solution of **sodium thiosulphate** in the cold, evolving ammonia; if heat is applied mercuric sulphide is formed (N. D., 846).

**Hydrates, Fixed Alkali.**—1. The fixed alkali hydrates are the hydrates of sodium and potassium. In aqueous solution they combine with **acids** to form salts. 2. Exposed to the **air** they absorb carbon dioxide. 3. In the presence of water and heat they liberate **ammonium** from its compounds. 4. They precipitate solutions of salts of all other common **metals** and the precipitate is a hydrate, except in case of silver, mercury, and antimony, in which cases it is an oxide. The precipitation is prevented or hindered with salts of

**mercury, lead, copper, antimony, aluminum, chromium, iron, zinc, and calcium**, by the presence of sugar, glycerin, acacia, citrates, tartrates, and other organic matter. 5. **Calomel** is turned black, due to the formation of mercurous oxide. 6. **Gallic acid** combines with the hydrates, forming compounds that vary in color from a green to a yellow or brown. [See ACIDUM GALLICUM, Nos. 1 and 2.] 7. **Tannic acid** combines with the hydrates, giving various colors on standing. [See ACIDUM TANNICUM, No. 2.] 8. Potassium hydrate with a concentrated solution of **tartaric acid** gives a precipitate of cream of tartar. 9. **Chloral hydrate** is decomposed by the alkali hydrates, giving chloroform and a formate of the base. 10. The alkali hydrates precipitate nearly all of the **alkaloids** from aqueous solution of their salts, the precipitate being the free alkaloid. In some cases the precipitate is soluble in excess of the hydrate. The precipitation is sometimes prevented by alcohol which is a solvent for the alkaloids. 11. They decompose some of the **alkaloids**, such as atropine, hyoscyamine, cocaine, and aconitine, when left in contact for some time, or more quickly when heated. 12. Alkali hydrates decompose many of the **glucosides** when warmed with them. 13. They dissolve some principles, as **santonin** and **cantharidin**. 14. With **fats** and **fixed oils** they form glycerin and a salt (soap) of the fat acid. 15. With **resins** they form resin soaps. 16. They decompose some substances like **salol** and **oil of wintergreen**. [See ALKALIES.]

**Hydrate, Volatile Alkali.**—Ammonium hydrate is the only common volatile alkali. 1. Ammonia combines with **acids** to form salts. 2. It precipitates solutions of salts of **lead, silver, mercury, bismuth, tin, antimony, copper, cadmium, iron, aluminum, chromium, cobalt, nickel, manganese, and zinc**. The precipitate is a hydrate, except in case of silver and antimony, when it is an oxide; in case of lead, it is a basic salt; in case of mercurous salts, the precipitate is a black double compound; and in case of mercuric

salts, the precipitate is a white double compound. The precipitation many times is prevented or hindered by sugar, glycerin, acacia, citrates, tartrates, and other organic matter. 3. A solution of **corrosive sublimate** is precipitated by ammonia, giving ammoniated mercury ( $\text{NH}_2\text{HgCl}$ ). 4. **Calomel** is converted into a black compound, nitrogen dihydrogen dimercurous chloride ( $\text{NH}_2\text{Hg}_2\text{Cl}$ ). 5. With **chlorine** ammonia forms ammonium chloride and nitrogen. If a larger proportion of chlorine gas is used, the ammonium chloride may be decomposed, forming hydrochloric acid and nitrogen. If a still larger proportion of chlorine gas is used, the ammonium chloride may be decomposed into hydrochloric acid and explosive nitrogen chloride (P. & J., 24). 6. **Bromine** acts somewhat like chlorine. 7. With **iodine** ammonium hydrate may under certain circumstances form ammonium iodide, ammonium iodate, and water; under different circumstances ammonium iodide and the explosive iodide of nitrogen are formed (P. & J., 24). [See IODUM, No. 2.] 8. **Permanganates** oxidize ammonium hydrate to a nitrate. 9. With **carbolic acid** ammonia gives at first a colorless solution, which slowly becomes green, then deep blue, and finally purplish blue. 10. With **carbolic acid** and **sodium hypochlorite** ammonia produces a deep blue color. 11. With a concentrated solution of **tartaric acid** ammonia gives a precipitate of ammonium bitartrate. 12. In concentrated solutions of **picric acid** ammonia gives a precipitate. 13. **Gallic acid** gives a yellow to a red-brown color with ammonia water. 14. **Chloral hydrate** is decomposed, giving chloroform and a formate of ammonium or chloral-ammonia. 15. Ammonia added to an alcoholic solution of **thymol** slowly gives a green color. 16. It precipitates nearly all **alkaloids** from aqueous solutions of their salts. The precipitate is the free alkaloid, and is sometimes soluble in a large excess of ammonia. [See ALKALIES.]

**Hydrogenii Dioxidum.** [See AQUA HYDROGENII DIOXIDI.]

**Hydroquinone.**—1. Hydroquinone is oxidized to quinone by **ferric chloride**, **chlorine**, **dilute nitric acid**, and **chromic acid** (M. & M., II. 730). 2. Strong **nitric acid** oxidizes it to oxalic acid (M. & M., II. 730). 3. An aqueous solution turns brown in the **air**, more quickly in the presence of an alkali. 4. A strong aqueous solution is precipitated by **ferric chloride**, soluble in excess of the latter (M. & M., II. 730).

**Hyoscyamina.**—1. Hyoscyamine is converted into atropine by **heating** to 248° F., or above its melting point, for five or six hours. 2. It is not precipitated by bicarbonates or ammonium carbonate, except from concentrated solutions. 3. It is easily decomposed by warming with **alkalies** or **water**. 4. It has about the same incompatibilities as atropine. [See ATROPINA.]

**Hyoscyamus.** [See ATROPINA.]

**Hypochlorites.**—1. The more common hypochlorites are found in the form of chlorinated lime, solution of chlorinated soda, and solution of chlorinated potassa. 2. Hypochlorites are decomposed by all **acids** at the ordinary temperature with liberation of chlorine. Consequently hypochlorites are strong oxidizing agents and have in general the same effect as chlorine. [See CHLORUM.] 3. The hypochlorites are soluble in water, but insoluble in alcohol. 4. Care should be used in mixing hypochlorites with readily **oxidizable substances** to avoid explosion or violent reaction. 5. They bleach **vegetable colors**. [See CALX CHLORATA.]

**Hypophosphites.** [See ACIDUM HYPOPHOSPHOROSUM.]

**Hyposulphites.** [See SODII THIOSULPHAS.]

**Ichthyol.**—1. **Acids** combine with the ammonia and precipitate the ichthyolsulphonic acid as a dark resinous mass which adheres to the sides of the vessel. 2. **Alkaline hydrates** or **carbonates** liberate ammonia. 3. **Ferric salts** in solution with ichthyol form compounds of iron and ichthyol, while at the same time a partial oxidation of ichthyol is

brought about by the ferric salt. **Ferrous salts** precipitate the sulpho-ichthyolate of iron (Am. D., XXVII. 364). 4. **Potassium mercuric iodide** precipitates it. 5. It is slowly precipitated by **mercuric chloride**. 6. Ichthyol precipitates **alkaloids** from solutions of their salts, forming a sticky resinous mass. 7. It is soluble in water, only partially soluble in alcohol or ether, but soluble in a mixture of the last two.

**Infusa.**—1. Infusions generally contain some tannic acid, albuminous and extractive matters, which are precipitated by many of the metallic salts, such as **mercuric chloride**, **lead acetate**, **silver nitrate**, **tartar emetic**, or **ferric chloride**. 2. When the tannic acid is present in considerable amount, infusions are incompatible with **alkaloidal salts**, because of the formation of the insoluble alkaloidal tannate. 3. Many of the infusions are decolorized by a solution of **lead subacetate** or by **aluminum hydrate**. 4. Infusions should not be mixed with alcoholic solutions of substances insoluble in water.

**Iodates.**—1. Iodates sometimes occur as impurities in iodides, and in such cases they liberate iodine when brought in contact with **acids**. 2. Iodates in solution with a dilute mineral acid are reduced to iodine by **hypophosphites**, **iodides**, **bromides**, **nitrites**, **arsenous acid**, **ferrous compounds**, and **morphine**.

**Iodida.** [See ACIDUM HYDRIODICUM.]

**Iodoform.**—1. Iodoform heated with a solution of an **alkali hydrate** gives an iodide and a formate. 2. **Silver nitrate** in solution decomposes iodoform, producing silver iodide, nitric acid, and carbon monoxide (M. & M., III. 33). Triturated dry with silver nitrate, violent reaction takes place with the formation of silver iodide, carbon dioxide, and nitrogen tetroxide (Ph. E., VIII. 302). 3. The color of a mixture of **calomel** and iodoform is yellow, but when it is exposed to light the color changes to red, due to the formation of the red iodide of mercury. Perhaps some chloroform is also produced. 4. When gently heated with yellow mer-

**curic oxide** iodoform is decomposed, giving carbon monoxide, formic acid, mercuric iodide, and water (M. & M., III. 33). 5. Exposed to direct **sunlight**, iodoform is completely oxidized by the **air**, forming carbon dioxide, iodine, and water (M. & M., III. 33). 6. Iodoform in solution or mixed with a **fatty substance** decomposes in the light, forming iodine and methyl iodide (M. & M., III. 33). For a time the iodine will be taken up by the fatty matter (unless it is petrolatum), forming colorless addition products (M. M. R., IX. 114). 7. Iodoform with **hydrogen dioxide water** seems not to be readily affected, but when in solution with ether hydrogen dioxide liberates iodine. 8. **Tannin** slowly deodorizes and decomposes iodoform. 9. **Balsam of Peru** deodorizes it and forms a compound with it (U. S. D., 741).

**Iodol.**—Iodol remains unchanged when heated below 100 C. (N. D., 879).

**Iodophenacetin.** (Iodophenin.)—1. **Water** decomposes iodophenacetin, liberating iodine (M. M. R., IV. 359). 2. **Alkalies** abstract iodine, regenerating phenacetin (M. M. R., IV. 359). 3. It should not be mixed with substances having a strong affinity for iodine.

**Iodum.**—1. In aqueous solution fixed **alkali hydrates** or **carbonates** decolorize iodine, forming soluble iodides and iodates. 2. Iodine with **ammonia water** slowly becomes colorless, forming chiefly ammonium iodide, with some ammonium iodate. There is a liability of there being precipitated a dark-brown powder, the "iodide of nitrogen," which when dry is easily and violently explosive. Explosive compounds of nitrogen and iodine may also be formed by mixing alcoholic solutions of ammonia and iodine; by adding a solution of chlorinated lime (neutralized by acetic acid) to an aqueous solution of ammonium iodide; by adding ammonia to a mixture of hydrochloric acid and iodic acid; by the action of nitrogen chloride on an aqueous solution of potassium iodide; or by adding an alcoholic solution of iodine to ammoniated mer-

cury. Analyses of the products of these reactions seem to show that at least three different explosive compounds are formed, differing in the number of hydrogen atoms replaced by the iodine (M. & M., III. 560). 3. **Nitric acid** slowly oxidizes iodine to iodic acid. 4. **Hypophosphites** are changed to phosphates, and the iodine is reduced to an iodide. 5. **Hydrogen sulphide** forms hydriodic acid and sulphur. 6. **Thiosulphates** form sulphates and an iodide. 7. **Sulphites** form sulphates and an iodide. 8. **Chlorine** forms iodic and hydrochloric acids, and in the presence of potassium hydroxide a periodate. 9. **Chlorates** in the presence of an acid form chlorides and iodic acid. 10. **Bromine** in the presence of an alkali hydroxide forms a bromide and an iodate. 11. Iodine changes **mercurous compounds** either in acid or alkaline mixtures to mercuric compounds, and the iodine is reduced to an iodide. 12. Iodine combines directly with metallic **mercury**, forming mercurous iodide and then mercuric iodide. 13. Iodine with **ammoniated mercury** sometimes forms the explosive iodide of nitrogen. 14. In the presence of water iodine combines with metallic **iron** to form ferrous iodide. 15. In the presence of an alkali iodine changes **ferrous compound** to ferric and **antimonious** to antimonie. 16. **Arsenous compounds** are changed to arsenic by iodine in the presence of an alkali. 17. Iodine with **lime** and water forms a bleaching mixture. 18. Iodine combines with most metals and with many non-metals, such as **chlorine**, **bromine**, **phosphorus**, or **arsenic**. 19. With iodine in a concentrated solution **potassium cyanide** forms potassium iodide and iodide of cyanogen (M. & M., II. 342). 20. Iodine reacts with **tannic acid** and water. [See ACIDUM TANNICUM, No. 12.] 21. Iodine when heated with **camphor** gives hydriodic acid, cymene, carvacrol, laurine, and other bodies (R. & S., III., part v. 427). 22. Iodine with **alcohol** heated with a fixed alkali yields iodoform. 23. **Starch** and preparations containing it are turned blue by iodine. If a larger amount of iodine is present, the color will be violet; and

if a still larger amount be added, the color changes to blue green. By heating the iodized starch to a temperature of  $70^{\circ}$  to  $80^{\circ}$  C. the color is destroyed, but on cooling it again assumes its blue color (P. & J., 265). 24. Iodine bleaches **litmus** and other vegetable colors. 25. It combines with many of the **fixed oils** to form additive compounds. 26. It combines with many **volatile oils**, and in some cases, as with turpentine, it acts with almost explosive violence. 27. In solution iodine slowly forms hydriodic acid. A freshly prepared tincture of iodine is precipitated by water, but an old tincture may not be, owing to the presence of the hydriodic acid. 28. Iodine, either in alcoholic solution or dissolved in an aqueous solution of potassium iodide, precipitates nearly all **alkaloids** from aqueous solutions of their salts. A large amount of alcohol present may prevent the precipitation. The precipitates from water are generally red brown and amorphous. Caffeine and theobromine in dilute solutions are not precipitated by iodine.

**Liquor Acidi Arsenosi.**—This solution contains free arsenous and hydrochloric acids. [See ACIDUM ARSENOSUM and ACIDUM HYDROCHLORICUM.]

**Liquor Ammonii Acetatis.**—Solution of ammonium acetate sometimes contains ammonium carbonate or free acetic acid. [See CARBONATES, AMMONIUM, and ACIDUM ACETICUM.]

**Liquor Arseni et Hydrargyri Iodidi.**—1. Donovan's solution precipitates nearly all **alkaloids** from aqueous solutions of their salts. 2. **Alkali hydrates** precipitate the mercury as the oxide. 3. **Silver nitrate** is precipitated as silver iodide. [See ACIDUM ARSENOSUM, ACIDUM HYDROCHLORICUM, and HYDRARGYRI CHLORIDUM CORROSIVUM.]

**Liquor Calcis.**—1. Lime water forms insoluble compounds with **tannic, tartaric, gallic, citric, and oxalic acids**. The compounds are generally more soluble in cold water than in hot. 2. **Heat** tends to throw the calcium hydrate out of solution. 3. Lime water has all of the incompatibilities of



the fixed alkali hydrates and of the calcium salts. [See HYDRATES, FIXED ALKALI, and CALCIUM.]

**Liquor Ferri Chloridi.** [See FERRICUM and ACIDUM HYDROCHLORICUM.]

**Liquor Ferri Dialysati.**—1. Many organic acids, the alkali hydrates and carbonates, some salts, and acacia precipitate or gelatinize the solution of dialysed iron. 2. It combines with **Fowler's solution**, precipitating the arsenic combined with ferric hydrate.

**Liquor Ferri et Ammonii Acetatis.** [See FERRICUM, AMMONIUM, and ACIDUM ACETICUM.]

**Liquor Ferri Subsulphatis.** [See FERRICUM and ACIDUM SULPHURICUM.]

**Liquor Iodi Compositus.** [See IODUM and ACIDUM HYDRIODICUM.]

**Liquor Plumbi Subacetatis.**—1. Goulard's extract is alkaline to litmus. 2. It is precipitated by nearly all organic acids, except formic, butyric, acetic, and lactic acids. 3. It precipitates from aqueous solutions nearly all alkaloids, glucosides, and neutral principles. 4. It precipitates albumin. 5. Mucilage of acacia is gelatinized by a solution of lead subacetate, but when both are diluted with water stringy masses are formed. 6. Lead subacetate precipitates concentrated solutions of antipyrin. 7. It unites readily with liquid or solid fats (N. D., 974). 8. Lead subacetate has all of the incompatibilities of lead acetate. [See PLUMBI ACETAS.]

**Liquor Potassæ.** [See POTASSA.]

**Liquor Potassii Arsenitis.**—1. Fowler's solution is alkaline, and contains some potassium bicarbonate which has been more or less changed to potassium carbonate. It consequently has the incompatibilities of a carbonate as well as those of a soluble arsenite. [See CARBONATES and ACIDUM ARSENOSUM.]

**Liquor Sodæ.** [See HYDRATES, FIXED ALKALI.]

**Liquor Sodæ Chloratæ.**—Labarraque's solution has

about the same incompatibilities as chlorine and soluble chlorides. [See **CHLORUM** and **ACIDUM HYDROCHLORICUM**.]

**Liquor Sodii Silicatis.**—1. This solution is precipitated by **alcohol**, concentrated mineral **acids**, or dilute acids with heat. 2. It gelatinizes mucilage of **acacia**. 3. It is strongly alkaline.

**Lithii Benzoas.** [See **LITHIUM** and **ACIDUM BENZOICUM**.]

**Lithii Salicylas.** [See **LITHIUM** and **ACIDUM SALICYLICUM**.]

**Lithium.**—1. The soluble lithium salts are precipitated from their solutions by soluble **carbonates**, the precipitate being lithium carbonate. 2. Soluble **phosphates** precipitate lithium phosphate. 3. With the exception of the carbonate and phosphate, the common lithium salts are generally soluble in water and in alcohol.

**Lobelia.**—1. Lobelia contains the volatile alkaloid lobeline, which is easily decomposed by **alkalies** or **hot water**. 2. It is precipitated by most **alkaloidal reagents**. [See **ALKALOIDS**, Nos. 1 and 2.]

**Magnesia.**—1. Magnesia combines with **acids** to form salts. 2. With fifteen times its weight of **water** it soon forms a gelatinous mass, due to the formation of magnesium hydrate. Magnesium hydrate is slightly soluble in water, and its action is similar to that of the fixed alkalies but weaker. 3. With sixteen times its weight of **copaiba** magnesia makes a thick or solid mass on standing, the copaiba combining to form magnesium copaivate. 4. Magnesia absorbs **carbon dioxide** from the air. [See **MAGNESIUM** and **HYDRATES**, **FIXED ALKALI**.]

**Magnesii Sulphas.** [See **MAGNESIUM** and **ACIDUM SULPHURICUM**.]

**Magnesium.**—Soluble salts of magnesium in concentrated aqueous solution are precipitated: 1. by the **fixed alkali hydrates** and the **hydrates of barium, strontium, and calcium**, as magnesium hydrate; 2. by the normal **carbonates**

of the fixed alkali metals, as basic carbonate of magnesium; 3. by the alkaline **phosphates**, as magnesium phosphate; 4. by alkaline **arsenates**, as magnesium arsenate; 5. by soluble **sulphites**, **oxalates**, or **tartrates**, as magnesium sulphite, oxalate, or tartrate respectively. 6. **Ammonium hydrate** or **carbonate** scarcely precipitates magnesium salts, and may prevent to some extent the precipitation by the fixed alkali hydrates and carbonates.

**Manganum.**—1. Salts of manganese in aqueous solution are precipitated by the fixed **alkali hydrates** as manganous hydrate, white but soon turning brown in the air from oxidation. **Ammonium hydrate** in the presence of ammonium salts scarcely precipitates manganous salts. 2. The **alkali carbonates**, **phosphates**, or **cyanides** precipitate the manganous carbonate, phosphate, or cyanide, all of which are white when first precipitated, but darken on exposure to air. 3. Manganous salts in alkaline mixture are oxidized to manganese dioxide by **chlorine**, **bromine**, and **iodine**.

**Mel.**—1. The presence of honey prevents the precipitation of some of the metallic salts by the alkali hydrates. 2. Honey decomposes **borax**, with liberation of boric acid, the reaction being somewhat similar to that between glycerin and borax. [See GLYCERINUM, No. 1.] 3. Honey when triturated with strong oxidizing agents, such as **potassium chlorate** or **potassium permanganate**, is liable to form an explosive mixture.

**Menthol.**—1. Menthol when triturated dry gives a liquid or soft mass with **borneol**, **bromal hydrate**, **butyl chloral hydrate**, **camphor**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **exalgin**, **naphtol**, **pyrocatechin**, **pyrogallol**, **resin**, **resorcin**, **thymol**, or **urethane**. 2. Fuming **nitric acid** forms an explosive oil (M. & M., III. 203). 3. **Potassium permanganate** in solution decomposes menthol, forming pimelic, formic, propionic, butyric, and oxymenthyllic acids (M. & M., III. 203). 4. **Chromic acid** oxidizes it to dextro- and lævo-menthol (U. S. D., 868).

5. Many concentrated **acids** dissolve menthol, the addition of water precipitating it again.

**Methacetinum.**—Methacetin produces a liquid when triturated with **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, or **pyrocatechin**; with **bromal hydrate** or **resorcin** it gives a stiff mass.

**Methylene-blue.**—1. Tetramethylthionine hydrochloride is decomposed by a strong solution of **potassium hydrate**, liberating the base as a violet precipitate (M. M. R., IV. 359). 2. **Reducing agents** cause the formation of a colorless substance, which again takes up oxygen, forming methylene-blue (M. M. R., IV. 359). 3. **Sulphuric acid** changes the blue aqueous solution to a bright green color (M. M. R., IV. 359). 4. In aqueous solutions **potassium iodide** and **potassium bichromate** precipitate the base as an iodide and a chromate (Allen, III. Part I, 286).

**Methyl Salicylas.**—1. Methyl salicylate, or artificial oil of wintergreen, gives with a dilute solution of a **ferric salt** a deep violet color, due to the formation of ferric salicylate. 2. **Alkali hydrates** decompose it, forming methyl alcohol and a salicylate. 3. Methyl salicylate has incompatibilities quite similar to those of the soluble salicylates. [See ACIDUM SALICYLICUM.]

**Morphina.**—1. Morphine combines with **acids** to form salts. 2. Morphine is precipitated from solutions (not too dilute) of its salts by **ammonium**, **potassium**, **sodium**, **calcium**, and **barium hydrates**, by **carbonates** of the alkalies and by **borax**. The precipitate is soluble in a large excess of the above mentioned fixed hydrates, but not so readily in the carbonates. Morphine tartrate is not precipitated by fixed or volatile hydrates (Blyth, 292). 3. The **bicarbonates** of the alkalies precipitate only a portion of the morphine from neutral solutions of its salts; tartaric acid prevents the precipitation (Watts, III. 1053). 4. Morphine is precipitated from solutions of its salts by **lead subacetate** (not neutral lead acetate), by **potassium chromate**, and by the **general**

**alkaloidal reagents.** 5. **Potassium cyanide** precipitates morphine usually as the free alkaloid, due to the alkalinity of the potassium salt, although some say that morphine cyanide is precipitated. 6. **Silver nitrate** is reduced by morphine and gives a red coloration (Sohn, 67). 7. **Ferric chloride** in nearly neutral solution gives a blue coloration, changing to a dirty green. This coloration is prevented or destroyed by excess of acid or alcohol. 8. **Nitric acid** gives a red color, changing to an orange and then a light yellow. 9. **Iodates** are reduced, liberating iodine. 10. **Gold chloride** precipitates morphine; the precipitate is first yellow, then blue, and finally purple (U. S. D., 879). The gold is reduced. 11. **Nitrous acid** or **spirit of nitrous ether** produces a yellow color with morphine. Morphine is converted into nitroso-morphine, pseudomorphine, and a base  $C_{17}H_{11}NO_2$  (M. & M., III. 436). 12. With **chlorine** a solution of morphine gives a yellow to an orange color, and if ammonia is added it is changed to red brown. 13. **Chlorates** oxidize morphine. 14. Morphine is oxidized by an alkaline solution of **potassium permanganate**, forming an acid (M. & M., III. 436). With an acid solution of potassium permanganate a green coloration is produced. 15. **Iodine** unites with morphine to form iodomorphine (Watts, III. 1052). 16. In a moderately strong aqueous solution morphine is precipitated as the free alkaloid by codeine. 17. Some of the physiological antagonists are **ammonia**, **amyl nitrite**, **atropine**, **caffeine**, **capsicum**, **cocaine**, **digitalis**, **gelsemium**, **picrotoxin**, **strychnine**, and **veratrum**. [See ALKALOIDS.]

**Mucilago Acaciæ.** [See ACACIA.]

**Mucilago Amyli.** [See AMYLUM.]

**Mucilago Tragacanthæ.** [See TRAGACANTHA.]

**Naphtalinum.**—1. Naphtalin is converted into nitro- or dinitro-naphtalin by **nitric acid**, according to the strength of the acid used (Allen, II. 508). 2. **Chlorine** and **bromine** form chloro- and bromo-derivatives. 3. Triturated dry with

phenol or salol naphthalin produces a liquid. It gives a damp powder with **pyrocatechin**.

**Naphtol**.—1. Beta-naphtol in aqueous solution imparts a pale green color when **ferric chloride** is added, and slowly deposits dinaphtol (M. & M., III. 460). 2. Warming with **sulphuric acid**, naphtol forms a sulphonic acid (Allen, II. 511). 3. **Chlorine** or **chlorinated lime** colors a solution of naphtol a pale green or yellow (Allen, II. 511). 4. A cold saturated aqueous solution of naphtol gives a faint bluish fluorescence with **ammonia** (U. S. D., 895). 5. Alkaline **potassium permanganate** oxidizes it to ortho-carboxy-cinnamic acid (M. & M., III. 460). 6. Beta-naphtol when triturated with **antipyrin**, **borneol**, **camphor**, **carbolic acid**, **ex-algin**, **menthol**, **pyrocatechin** or **urethane** gives a liquid or a soft mass.

**Nitrates**. [See ACIDUM NITRICUM.]

**Nitrites**. [See ACIDUM NITROSUM.]

**Nux Vomica**. [See STRYCHNINA.]

**Olea Fixa**.—1. Fixed oils with solutions of **alkali hydrates**, **lime water**, and **oxides** of many metals, form oleates (soaps) of the base and glycerin. 2. The olein of fixed oils with **nitric acid** or **nitrous acid gas** forms the isomeric elaidin, which is solid. 3. Fixed oils absorb and combine with **bromine** and **iodine**, forming addition products. 4. Concentrated **nitric acid** and concentrated **sulphuric acid** give various color reactions with different oils. 5. Fixed oils do not dissolve readily in glycerin or alcohol.

**Olea Volatilia**.—1. Volatile oils with concentrated **sulphuric acid** generally give a yellow color, turning brown and sometimes red. 2. Concentrated **nitric acid** gives color-reactions with many oils. 3. **Potassium hydrate** saponifies the resinified portions of the oils. 4. **Ferric chloride** gives colors with some of the oils. [See FERRICUM, Nos. 28, 29, 30, and 31.] 5. **Iodine** reacts violently with some oils, particularly the hydrocarbon oils.

**Oleum Æthereum.**—1. Ethereal oil with **water** is slowly decomposed, forming sulphovinic acid and a light oil of wine (N. D., 1105). 2. The sulphuric acid is not precipitated by the general precipitants of this acid because it exists in the form of sulphovinates, which are soluble (U. S. D., 919).

**Oleum Amygdalæ Amarae.**—1. Oil of bitter almonds contains chiefly benzaldehyde with a little hydrocyanic acid; the artificial oil consists of benzaldehyde. 2. Benzaldehyde is readily oxidized by the **air** and by **oxidizing agents**, forming benzoic acid, which may crystallize so as to form a mass. Alcohol prevents this to some extent. 3. With an aqueous or alcoholic solution of **potassium hydrate** it gives benzyl alcohol and potassium benzoate. 4. **Ammonia water** converts it into crystalline hydrobenzamid, which is again resolved by acids into ammonia and benzoic aldehyde (Allen, III. Part I, 18). A mixture of ammonia and the oil turns yellow on standing. 5. **Chlorine** converts it into benzoyl chloride. 6. Benzaldehyde with **resorcin** in the presence of hydrochloric acid forms a resin; **phenol** and **pyrocatechin** act similarly (M. & M., I. 472). 7. With an aqueous solution of **sodium bisulphite** a crystalline compound is produced.

**Oleum Aurantii Corticis.**—1. Oil of orange gives a deep-red or a red-brown color with **sulphuric acid**. 2. **Nitric acid** gives a greenish-yellow color. 3. Exposed to the **air** the oil is oxidized and acquires a turpentine odor and taste. 4. **Iodine** reacts violently with the oil.

**Oleum Betulæ Volatile.**—Oil of sweet birch consists chiefly of methyl salicylate. [See METHYL SALICYLAS.]

**Oleum Caryophylli.**—1. Oil of cloves dissolved in a little alcohol gives a bright green color when a solution of **ferric chloride** is added. If the solution of ferric chloride is quite dilute, a blue color is produced, which soon changes to yellow (U. S. P., 275). Clove water gives a yellow or brown solution or precipitate with a solution of ferric chloride. 2. **Iodine** dissolves quietly in the oil. 3. **Nitric acid** changes

its color to a deep red, and if heat be used the oil is converted into oxalic acid (U. S. D., 931). 4. Strong solutions of **alkalies** convert it into a crystalline mass of potassium eugenol (N. D., 1117).

**Oleum Cinnamomi.**—1. Oil of cinnamon dissolved in alcohol gives a brown color with a solution of **ferric chloride**. Cinnamon water with solution of ferric chloride gives a brown color and a slight precipitate. 2. With a saturated solution of **sodium bisulphite** the oil solidifies to a crystalline mass. 3. **Nitric acid** slowly oxidizes it to a crystalline mass of cinnamic acid. 4. **Iodine** dissolves in it quietly, forming a thick mass (N. D., 1119). 5. Cinnamon water gives a turbidity with a solution of **lead acetate**.

**Oleum Gaultheriæ.**—Oil of wintergreen is chiefly methyl salicylate. [See METHYL SALICYLAS.]

**Oleum Gossypii.**—1. Cottonseed oil with **sulphuric acid** gives a dark red-brown color. 2. **Nitric acid** with heat converts the oil into a red-brown mass that partially solidifies on standing. 3. With an **alkali hydrate** it forms a soap. 4. It combines with **iodine** to form colorless compounds.

**Oleum Lavendulæ.**—Oil of lavender reacts violently with **iodine** or **bromine**.

**Oleum Limonis.**—1. Oil of lemon reacts violently with **iodine** or **bromine**. 2. Exposed to **air** and **light** it absorbs oxygen, forming a resinous substance and ozone. 3. Concentrated **nitric acid** turns it brown and resinous.

**Oleum Lini.**—1. Linseed oil is ignited by **fuming nitric acid**. Nitric acid of sp. gr. 1.33 turns it green and afterwards brown. 2. **Alkali hydrates** convert it into a soft soap. 3. An alkaline solution of **potassium permanganate** converts it into sativic acid (M. & M., III. 147). 4. Exposed to **air** the oil oxidizes and ultimately becomes solid. If the oil be distributed through cotton, the heat generated by the oxidation may be sufficient to cause ignition. 5. **Iodine** and **bromine** form additive compounds.



**Oleum Menthae Piperitæ.**—1. Oil of peppermint dissolves **iodine** quietly and becomes thicker. 2. **Chloral hydrate** colors the oil red. This is perhaps due to an impurity in the chloral hydrate (N. D., 1131). 3. An alcoholic solution of the oil with **salicylic acid** turns green slowly (N. D., 1131).

**Oleum Olivæ.**—1. Olive oil heated with **nitric acid** gives a mass that solidifies. 2. **Alkaline hydrates** convert it into soap. 8. **Iodine** combines with it, forming colorless compounds.

**Oleum Pimentæ.**—An alcoholic solution of oil of pimenta with a solution of **ferric chloride** gives a bright green color. If the iron solution be very dilute, a blue color is formed, changing to green and then yellow (U. S. P., 285). Pimenta water with a solution of ferric chloride gives a precipitate which increases and becomes brown.

**Oleum Sassafras.**—1. **Nitric acid** reacts violently with oil of sassafras, converting it into a red liquid and finally into a red resin. 2. **Sulphuric acid** gives the oil a deep red color which soon becomes blackish (U. S. P., 288). 3. **Iodine** and **bromine** react with the oil.

**Oleum Terebinthinæ.**—1. Oil of turpentine with a small proportion of **sulphuric acid** is partially converted into terebene. 2. Dry **hydrochloric acid gas** with oil of turpentine forms a crystalline monohydrochloride of terpene. This has been called "artificial camphor." 3. **Chlorine** and **bromine** react so violently that the oil is frequently ignited. 4. **Iodine** is dissolved by oil of turpentine to form a green solution, which afterwards becomes hot and gives off vapors of iodine and hydriodic acid; and when considerable quantities of iodine and turpentine oil are brought suddenly together, explosion frequently ensues (Allen, II. 424). 5. Heated with **chlorinated lime**, oil of turpentine yields chloroform (Allen, II. 424). 6. If oil of turpentine is left in contact with **water**, it gradually changes into terpin hydrate. This reaction is hastened by the presence of **nitric acid** (Allen, II. 424) or by

alcohol (U. S. D., 971). 7. **Nitric acid** converts the oil into resinous matter, the violence of the reaction and the products formed depending on the strength of the acid. Some of the products formed are acetic, propionic, butyric, paratoluic, and terebic acids. 8. **Fuming nitric acid** reacts violently and may set the oil on fire. 9. Strong **chromic acid** solution oxidizes oil of turpentine to acetic acid and other products (Allen, II. 425). 10. The oil when exposed to **air** slowly absorbs oxygen and forms a resinous substance, which seems to have the power of producing hydrogen dioxide (U. S. D., 971). Oil of turpentine absorbs **oxygen** and gives formic and acetic acids, carbon dioxide, ozone, and resinous bodies (Watts, V. 921).

**Opium.**—1. A solution of opium contains many alkaloids and other substances that are generally incompatible with the inorganic **salts**, **general alkaloidal reagents**, and many other compounds. [See MORPHINA, ALKALOIDS, and ACIDUM MECONICUM.]

**Oxidizing Agents.**—Strong oxidizing agents, such as chromic, nitric, and nitrohydrochloric acids, chromates, nitrates, chlorates, permanganates, should not be triturated with substances that are easily oxidized, as, for instance, **sulphur**, **sulphides**, **sulphites**, **hypophosphites**, **iodine**, **charcoal**, **tannic acid**, **carbolic acid**, **honey**, **sugar**, **glycerin**, **starch**, and **vegetable matter**.

**Pancreatinum.**—1. An aqueous solution of pancreatin is precipitated by strong **alcohol**. 2. The activity of pancreatin is destroyed by continued contact with **acids**. 3. Exposed to **air** it becomes less active.

**Paraldehydum.**—1. Paraldehyde with fixed **alkali hydrates** forms aldehyde resin which resembles colophony. 2. It is a strong reducing agent and is oxidized to an acid. 3. **Chlorine** forms substitution products. 4. **Hydrocyanic acid** combines with aldehydes to form nitrites (M. & M., I. 107). 4. Paraldehyde liberates iodine from **iodides** (Ph. Era, XVII. 298).

**Pepsinum.**—Pepsin is rendered inert by **alkaline substances**, by prolonged contact with **alcohol**, or by **tannic acid**.

**Permanganates.** [See POTASSII PERMANGANAS.]

**Phenacetinum.**—1. Phenacetin in strong aqueous solution gives with **chromic acid**, **chlorine**, **chlorinated lime**, **iodine**, and some other **oxidizing agents** colorations varying from pink to red. These colorations are due to the presence of parphenetidin in the phenacetin, or upon its formation by decomposition of the phenacetin (M. M. R., IV. 359). 2. Heating phenacetin with hydrochloric acid and then adding a solution of **ferric chloride** gives a red color. 3. **Salicylic acid** when triturated with phenacetin is said to give a pasty mass. The writer failed to get anything but a dry powder. 4. Phenacetin triturated with **carbolic acid**, **chloral hydrate**, or **pyrocatechin** gives a liquid. 5. It is decomposed by strong **acids** or **alkalies** (Scoville, 234). 6. Phenacetin combines with **iodine** to form a compound known as iodo-phenin. 7. Phenacetin conceals the fluorescence of **quinine sulphate**, especially in dilute solutions.

**Phenocoll Hydrochloridum.**—1. Phenocoll hydrochloride in aqueous solution is precipitated by the **alkaline hydrates** and **carbonates** as the free base. 2. **Piperazin** is said to precipitate the base phenocoll when mixed with a strong solution of phenocoll hydrochloride. According to Roe, the best results for making a solution are obtained when the phenocoll salt is from fifty to one hundred per cent. in excess of the piperazin, and each compound should be dissolved in a portion of water before being mixed (D. C., XXXIX. 14). 3. The fluorescence of **quinine sulphate** is destroyed by phenocoll hydrochloride.

**Phosphates.** [See ACIDUM PHOSPHORICUM and SODII PHOSPHAS.]

**Phosphorus.**—1. Phosphorus is oxidized in the **air**, forming oxides of phosphorus, and may cause fire. 2. A warm solution of **potassium** or **sodium hydrate** or **lime**

**water** with phosphorus gives a hypophosphite and phosphorus hydride gas. 3. In the presence of water, **chlorine**, **bromine**, or **iodine** oxidizes phosphorus and forms phosphoric acid and hydrochloric, hydrobromic, or hydriodic acid. 4. Phosphorus is oxidized by **nitric acid**, **chromic acid**, **old oil of turpentine**, and other substances rich in oxygen. 5. When phosphorus is triturated with **potassium chlorate**, **chromic oxide**, **lead dioxide**, **mercuric oxide**, **silver oxide**, **potassium bichromate**, **potassium nitrate**, **sulphur**, or **sulphides**, explosion is liable to take place.

**Physostigmina.** — 1. Physostigmine is precipitated from aqueous solutions of its salts by the **general alkaloidal reagents**, except picric acid and platinum chloride. 2. **Alkaline hydrates** and **carbonates** precipitate the alkaloid from concentrated aqueous solutions of its salts and give a red color, changing to yellow, green, and blue (Sohn, 23). The red color is due to the formation of rubreserine (N. D., 1221). 3. **Gold chloride** gives a blue coloration. 4. A solution of **chlorine** or **bromine** gives a red coloration. 5. **Nitric acid** gives a yellowish-red color. 6. The free alkaloid precipitates iron as the hydrate from a solution of **ferric chloride** (N. D., 1221). 7. Physostigmine is physiologically incompatible with **atropine**, **chloral hydrate**, **morphine**, **strychnine**, and **caffeine**. [See ALKALOIDS.]

**Picrotoxinum.** — 1. Picrotoxin combines with **alkali hydrates**, forming soluble compounds; acids added to solutions of these cause the precipitation of the picrotoxin. 2. **Chloral hydrate** is a physiological antagonist.

**Pilocarpinae Hydrochloridum.** — 1. Pilocarpine hydrochloride in aqueous solution is precipitated by the reagents that generally precipitate alkaloids, except that it is not readily precipitated by alkali hydrates and carbonates. 2. When this alkaloidal salt is mixed with **calomel** in the presence of moisture a darkening occurs. This is probably due to the separation of metallic mercury while at the same time some mercuric chloride is formed which combines with

the alkaloid. 3. **Potassium permanganate** oxidizes it to pyridin (M. & M., IV. 275). 4. **Atropine** has an opposite effect physiologically.

**Piperazinum.**—1. Piperazin combines with **acids** to form salts. 2. With an aqueous solution of piperazin **alum** gives a white precipitate. 3. **Ferrous sulphate** gives a dark green precipitate which turns brown on standing. 4. **Ferric chloride** gives a red-brown precipitate. 5. An aqueous solution of piperazin is precipitated by **mercuric chloride**, **copper sulphate**, **potassium mercuric iodide**, **Donovan's solution**, **picric** and **tannic acids**. 6. On account of its strong alkalinity piperazin gives precipitates with solutions of **alkaloidal salts** and with some **inorganic salts**. 7. **Potassium permanganate** and **silver nitrate** are reduced by piperazin. 8. **Sodium hypochlorite** solution forms a body with piperazin that explodes when heated to a temperature of  $80^{\circ}$ – $85^{\circ}$  C. (M. & M., IV. 349). 9. **Bromine water** forms the corresponding di-bromo-piperazin (M. & M., IV. 349). 10. With **spirit of nitrous ether** piperazin gives a yellow to a red solution. 11. **Quinine** is said to give an amorphous violet-brown body with piperazin (M. & M., IV. 349). Piperazin gives a white precipitate with a solution of quinine sulphate and destroys the fluorescence. 12. **Phenol** combines with piperazin. 13. When piperazin is triturated dry with **butyl chloral hydrate**, **acetanilid**, **antipyrin**, **carbolic acid**, **chloral hydrate**, or **phenacetin**, a liquid or soft mass is formed. This is due in some instances to chemical combination and sometimes to the fact that piperazin is very hygroscopic.

**Plumbi Acetas.**—1. Lead acetate in aqueous solution is precipitated by the **fixed alkali hydrates** as lead hydrate which is soluble in excess of the alkali hydrate. The precipitation is prevented by the presence of glycerin and sugar to some extent. 2. **Ammonium hydrate** does not precipitate lead acetate, except from a concentrated solution. 3. The soluble **carbonates** precipitate the white basic carbonate of lead. 4. **Borax** precipitates the white lead borate. Precip-

itation is prevented to some extent by glycerin and sugar. 5. **Sulphuric acid** and the soluble **sulphates** precipitate the white lead sulphate. 6. **Hydrochloric acid** and the soluble **chlorides** precipitate from not too dilute solutions of lead acetate the white lead chloride. 7. The soluble **bromides** precipitate the white lead bromide. 8. The soluble **iodides** precipitate the yellow lead iodide. 9. Soluble **chromates** precipitate the yellow lead chromate. 10. **Sodium phosphate** precipitates the white lead phosphate. 11. **Alkali sulphites** precipitate the white lead sulphite. 12. The soluble **cyanides** precipitate white lead cyanide. 13. **Tannic acid** and solutions containing it precipitate the yellow-gray lead tannate. 14. Solutions of lead acetate are precipitated by neutral soluble **benzoates**, **citrates**, **tartrates**, and **salicylates**. 15. **Pyrogallol** gives a white precipitate which becomes brown and black on exposure to air and light. 16. Lead acetate gives a precipitate with some **coloring matters**, **gums**, **resins**, **neutral principles**, **glucosides**, and **alkaloids**. 17. With a solution of **opium** lead acetate forms the acetates of the alkaloids and the insoluble lead meconate and sulphate. 18. Lead acetate gives a liquid or soft mass when rubbed with **acetamid**, **carbolic acid**, **chloral hydrate**, **salicylic acid**, **sodium phosphate**, or **urea**. It gives a stiff mass with **pyrocatechin**, **pyrogallol**, **resorcin**, **sodium salicylate**, or **urethane**.

**Plumbi Subacet.** [See LIQUOR PLUMBI SUBACETATIS.]

**Potassa.**—Potassium hydrate has the incompatibilities of the fixed alkali hydrates. [See HYDRATES, FIXED ALKALI, and POTASSIUM.]

**Potassii Acetas.** [See ACIDUM ACETICUM.]

**Potassii Bicarbonas.** [See CARBONATES.]

**Potassii Bichromas.** [See ACIDUM CHROMICUM.]

**Potassii Bitartras.**—1. Cream of tartar combines with the **hydrates** and **carbonates** of the **alkalies** to form neutral soluble salts. 2. Cream of tartar becomes more soluble in solutions of **borax** or **boric acid**. 3. It is acid in

reaction, and has the incompatibilities of tartaric acid. [See ACIDUM TARTARICUM.]

**Potassii Bromidum.** [See ACIDUM HYDROBROMICUM.]

**Potassii Carbonas.** [See CARBONATES.]

**Potassii Chloras.** [See CHLORATES.]

**Potassii Citras.** [See ACIDUM CITRICUM.]

**Potassii Cyanidum.**—Potassium cyanide is strongly alkaline and usually contains a carbonate. [See ACIDUM HYDROCYANICUM and CARBONATES.]

**Potassii et Sodii Tartras.**—Nearly all acids when added to a strong solution of Rochelle salt combine with the sodium and precipitate the potassium bitartrate. [See ACIDUM TARTARICUM.]

**Potassii Hypophosphis.** [See ACIDUM HYPOPHOSPHOROSUM.]

**Potassii Iodidum.**—Potassium iodide sometimes contains a carbonate as an impurity. [See ACIDUM HYDRIODICUM.]

**Potassii Nitras.** [See ACIDUM NITRICUM.]

**Potassii Permanganas.**—1. Potassium permanganate in acid solution is reduced to the manganous condition by nitrous acid and nitrites, forming nitric acid; 2. by hydrochloric acid and chlorides, liberating chlorine; 3. by hydrobromic acid and bromides, liberating bromine; 4. by hydriodic acid and iodides, liberating iodine; 5. by sulphites and hyposulphites, forming sulphates; 6. by mercurous compounds, forming mercuric compounds; 7. by arsenites, forming arsenates; 8. by ferrous compounds, forming ferric compounds; 9. by hypophosphites, forming phosphates; 10. by ammonia, forming nitrates. 11. With hydrogen dioxide water mixed with sulphuric acid, potassium permanganate forms manganous sulphate, potassium sulphate, water, and oxygen, the oxygen coming from both the permanganate and hydrogen dioxide. 12. Tartaric acid is converted into formic acid and carbon dioxide, more readily in a neutral or alkaline

mixture (M. & M., IV. 642). 13. **Carbolic acid** is oxidized by potassium permanganate, forming oxalic acid and carbon dioxide. 14. **Alcohol** is oxidized to aldehyde and acetic acid, the manganese dioxide and monoxide being precipitated. 15. **Glycerin** gives a precipitate similar to that produced by alcohol, and is oxidized to formic, propionic, and tartronic acids and carbon dioxide (M. & M., II. 618). 16. In dilute aqueous solution potassium permanganate is reduced by nearly all **organic matter**; in concentrated solution the reaction may be so great as to cause explosion. 17. When potassium permanganate is triturated dry with **sulphur, sulphides, reduced iron, hypophosphites, charcoal, sugar, glycerin, alcohol, tannic acid, oxalic acid, picric acid, fats, oils, gums,** and other **readily oxidizable matter**, an explosion is liable to ensue. 18. The permanganates are all soluble in water, except silver, which is sparingly soluble. They are insoluble in alcohol.

**Potassium.**—1. Potassium salts in the presence of a solution of **platinic chloride** and hydrochloric acid give a yellow precipitate of a double compound of platinum and potassium chloride. 2. Most neutral potassium salts in not too dilute aqueous solution with **sodium bitartrate** give a precipitate of potassium bitartrate. 3. A solution of the hydrate or carbonate of potassium with an excess of **tartaric acid** gives a precipitate of potassium bitartrate.

**Pyoktannin.**—1. Pyoktannin in solution is decomposed slowly in the **light**. 2. Fixed **alkali hydrates** added to a solution of pyoktannin decolorize the solution and deposits a red precipitate. 3. **Ammonia** decolorizes a solution of pyoktannin and gives a purplish precipitate. 4. Pyoktannin is said to be incompatible with **mercuric chloride**.

**Pyrocatechin.**—1. An alkaline solution of pyrocatechin assumes a green color, changing to brown, and finally black. 2. With a solution of **ferric chloride** it gives a green color, changed to a violet red by ammonia. 3. With a solution of **lead acetate** it gives a white precipitate. 4. **Nitric acid** acts



violently, converting it into oxalic acid (M. & M., IV. 358). 5. **Ammonium carbonate** with water converts the pyrocatechin into pyrocatechuic acid (M. & M. IV. 358). 6. With a concentrated solution of pyrocatechin **lime water** gives a greenish color. 7. It reduces **silver nitrate** to metallic silver. 8. Pyrocatechin forms a liquid with **acetamid**, **acetanilid**, **antipyrin**, **borneol**, **bromal hydrate**, **butyl chloral hydrate**, **camphor**, **monobromated camphor**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **exalgin**, **menthol**, **methacetin**, **naphtol**, **phenacetin**, **pyrogallol**, **salol**, **sodium phosphate**, **urea**, or **urethane**. It gives a stiff mass with **diuretin**, **lead acetate**, or **thymol**, and a damp powder with **naphtalin** or **resorcin**.

**Pyrogallol**.—1. Pyrogallic acid in aqueous solution gradually absorbs oxygen from the **air** and becomes brown red and acid. The coloration takes place more rapidly in the presence of alkalis, changing to nearly black. 2. With **ammonia** pyrogallein is formed (M. & M., IV. 359) and the solution becomes red. 3. With a solution of a **ferrous sulphate** pyrogallol gives a deep blue solution, changing to green and ultimately red. 4. With a solution of **ferric chloride** a red color is formed at once, and it is turned to violet by adding ammonia. 5. With a solution of **ferric acetate** a purple-black coloration is formed. 6. With **lead acetate** pyrogallol gives a white precipitate which turns dark on exposure. 7. With **lime water** a purple color is produced, rapidly changing to brown. 8. Pyrogallic acid is changed to purpurogallin by an alcoholic solution of **silver nitrate**, by an aqueous solution of **potassium permanganate**, or by an aqueous solution of **ferric chloride** in excess (M. & M., IV. 359). 9. Pyrogallol in aqueous solutions reduces salts of **silver**, **mercury**, and **gold**, and it is oxidized to acetic and oxalic acids (Richter, 695). 10. Pyrogallol gives a liquid or soft mass when rubbed with **acetamid**, **antipyrin**, **camphor**, **carbolic acid**, **exalgin**, **menthol**, **pyrocatechin**, **urea**, or

**urethane.** It gives a stiff mass with **diuretin**, **lead acetate**, or **sodium phosphate**.

**Pyroxylinum.**—1. Soluble gun-cotton when damp undergoes decomposition, and may ignite or cause an explosion. 2. Treated with **alkalies** in concentrated solution it is decomposed, giving up its nitric acid. 3. The nitro-cellulose is converted back to cellulose by **reducing agents**, such as ferrous salts or alkali sulphides (Richter, 514). [See COLLODIUM.]

**Quinina.**—1. Quinine unites with **acids** to form salts. 2. Quinine is precipitated from aqueous solutions of its salts by all the reagents mentioned under ALKALOIDS, Nos. 2 and 3, except bromides and iodides; in concentrated solutions these may also give precipitates. 3. **Hypophosphorous** acid aids the solution of quinine sulphate, but if added in sufficient amount **potassium hypophosphite** destroys the fluorescence and causes precipitation. 4. Quinine is precipitated from solution of its salts by the **alkali acetates** as the voluminous quinine acetate. [See ACIDUM ACETICUM, No. 4.] 5. **Citric acid** aids the solution of quinine sulphate in water. Adding an **alkali citrate** destroys the fluorescence and precipitates the quinine. 6. Quinine is precipitated from its concentrated aqueous solutions by **benzoates**, **salicylates**, and **tartrates**, the precipitate generally being bulky. 7. Quinine gives a blue fluorescence with nearly all **acids** that contain oxygen. 8. The fluorescence is destroyed by the **halogen acids**, **salts** of the **halogens**, **antipyrin**, **acetanilid**, **phenacetin**, **phenocoll hydrochloride**, or **piperazin**. 9. When the alkaloid quinine is heated with solutions of **ammoniacal salts** ammonia gas is liberated. 10. Quinine sulphate is oxidized by **potassium permanganate** to pyridin tricarboxylic acid, oxalic acid, and ammonia (M. & M., IV. 375). 11. An aqueous solution of quinine sulphate in **sunlight** turns yellow and then brown, and gives a brown flocculent precipitate, due to the formation of quiniretin (N. D., 1351). 12. When quinine sulphate is rubbed with **thymol** it gives a soft mass; with **chloral hydrate**

it gives a damp powder or stiff mass. 13. The solubility of quinine sulphate in water is increased by the presence of certain compounds, as **ammonium chloride**, **potassium nitrate**, and **antipyrin**. [See ALKALOIDS.]

**Resina.**—1. Pine resin when triturated with **menthol**, **salol**, **carbolic acid**, or **urethane** makes a liquid or sticky mass. 2. **Nitric acid** oxidizes it to isophthalic and trimellitic acids (M. & M., I. 1). 3. **Potassium permanganate** oxidizes it to formic, acetic, and carbonic acids (M. & M., I. 1).

**Resinæ.**—1. With aqueous solutions of **alkali hydrates** or **carbonates** resins form resin soaps which are generally soluble in water. 2. **Nitric acid** converts them into artificial tannin (U. S. D., 1150). 3. Concentrated **sulphuric acid** dissolves many of the resins with decomposition and gives color reactions with some. 4. Tincture of **ferric chloride** gives different colors with resinous substances. [See FERRICUM, No. 26.] 5. **Alcohol** containing **hydrochloric acid** is colored red to violet by myrrh; yellowish brown to green by guaiac; yellow, changing through brown to cherry-red, by benzoin or balsam of Tolu; greenish, changing to dingy violet, by asafœtida; and brown by some other resins.

**Resorcinum.**—1. An aqueous solution exposed to the **air** becomes red and brown. This reaction is hastened by the presence of **alkalies**. 2. With a dilute solution of **ferric chloride** resorcin gives a violet coloration. 3. With **chlorinated lime** or **soda** a solution of resorcin gives a violet coloration, changing to yellow. 4. **Nitrous acid** or **spirit of nitrous ether** gives a dark red solution with resorcin. Nitrous acid acting on a dilute solution of resorcin produces di-nitroso-resorcin (Richter, 690). 5. Resorcin produces a liquid or soft mass when triturated with **acetamid**, **acetanilid**, **ammonol**, **antipyrin**, **borneol**, **camphor**, **carbolic acid**, **chloral alcoholate**, **euphorin**, **exalgin**, **menthol**, **methacetin**, or **urethane**. With **lead acetate**, **pyrocatechin**, or **sodium phosphate** it gives a slightly damp powder, which quickly dries.

**Saccharum.**—1. A solution of sugar heated with **lime**,

**magnesia, litharge,** and other metallic **oxides** and **hydrates** form saccharates, chemical compounds which are more or less soluble in water. 2. The presence of sugar hinders or prevents the precipitation, or dissolves the precipitate, of many metallic hydrates or oxides which are normally formed when alkali hydrates are added to solutions of metallic salts. The interference is most marked in case of **lead, antimony, copper, mercuric, ferrous, ferric, aluminum, zinc, calcium,** and **magnesium salts.** 3. Very strong **nitric acid** with sugar, in the cold, forms explosive nitrosaccharose (Allen, I. 214). Moderately concentrated nitric acid converts sugar into saccharic and tartaric acids, and with heat into oxalic acid and carbon dioxide (Allen, I. 214, 240). 4. With concentrated **sulphuric acid** sugar is decomposed, forming carbon, while formic acid, sulphur dioxide, and other gases are given off (Allen, I. 215). 5. Sugar warmed with dilute solutions of **acids,** or heated for some time with **water,** is changed to invert-sugar. 6. When a concentrated solution of sugar and **potassium hydrate** is heated, carbon dioxide, acetone, acetic, propionic, and oxalic acids are formed (M. & M., IV. 551). 7. **Chlorine** or **bromine** oxidizes sugar to gluconic acid, glucose and other products. The same reaction takes place in the presence of lead or silver oxide (M. & M., IV. 551). 8. **Iodine** with potassium carbonate and sugar yields a little iodoform (M. & M., IV. 551). 9. Dilute **chromic acid** solution oxidizes sugar to oxalic, formic, and carbonic acids (M. & M., IV. 551). 10. **Potassium permanganate** converts sugar into oxalic, formic, and carbonic acids (M. & M., IV. 551). 11. Sugar triturated with **potassium chlorate, permanganate,** or **bichromate,** or with other strong oxidizing agents, is liable to cause an explosion.

**Saccharum Lactis.**—1. Milk-sugar in alkaline solution reduces salts of **silver, mercury, bismuth,** or **copper** (N. D., 1398). 2. **Nitric acid** first inverts milk-sugar and then forms mucic and saccharic acids, and if heated forms tartaric and racemic acids and finally oxalic acid. 3. Dilute **acids** invert

milk-sugar, forming dextrose and galactose. 4. A mixture of sulphuric and nitric acids with milk-sugar gives lactose pentanitrate, which is explosive (M. & M., IV. 553). 5. **Chromic acid** with milk-sugar yields aldehyde (M. & M., IV. 553). 6. **Alkali permanganates** oxidize milk-sugar. 7. **Silver oxide** oxidizes it, forming oxalic, glycollic, and lactonic acids (M. & M., IV. 553). 8. Milk-sugar with a solution of **iodine** and sodium bicarbonate yields a little iodoform (M. & M., IV. 553). 9. Triturated with **oxidizing agents**, it is liable to cause an explosion.

**Salicinum.**—1. Salicin is not readily precipitated by any of the common precipitants. 2. Dilute **acids** or **water** with heat changes it to glucose and saligenin.

**Salicylates.** [See ACIDUM SALICYLICUM.]

**Salocoll.**—1. Phenocoll salicylate gives a violet-red color with a tincture of **iron**. 2. Triturated with **chloral hydrate** it liquefies.

**Salol.**—1. Salol in alcoholic solution gives a violet color when a dilute solution of **ferric chloride** is added to it. If, however, a little of the salol solution be added to the ferric chloride solution, a white cloudiness, but no violet color, will appear (U. S. P., 344). In aqueous solution no increase of color results. 2. **Bromine water** added to an alcoholic solution of salol will cause the formation of long needle-shaped crystals, consisting of a bromo-derivative. 3. Strong solutions of **alkalies** heated with salol saponify it, forming a salicylate and carbolic acid (Allen, III. part I. 60). 4. When salol is triturated dry with **borneol**, **camphor**, **monobromated camphor**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **exalgin**, **naphtalin**, **pyrocatechin**, **resin**, **thymol**, **trional**, or **urethane**, a liquid or soft mass results. It gives a slightly damp powder with **antipyrin**, quickly drying.

**Salophen.**—Salophen, on account of the salicylic acid which it contains, gives a violet-red color with tincture of **iron**.

**Santonin.**—1. Santonin on exposure to light turns yellow, forming photo-santonin acid and a yellow-resinous body (N. D., 1414). 2. With **alkali hydrates** in solution it forms santoninates, which are soluble in water. 3. An aqueous solution of santoninate is precipitated by **lead acetate** or **lead subacetate** as lead santoninate. It is also precipitated by **tannic acid**, **ferrous sulphate**, **copper sulphate**, **chlorine water**, and by **acids** if the solution of santoninate is not too dilute. 4. Santonin is turned pink or red by **potassium hydrate** in the presence of alcohol. 5. Heated with **nitric acid**, santonin forms carbon dioxide, succinic, oxalic, and acetic acids (M. & M., IV. 429).

**Sapo.**—1. Aqueous solutions of soap are decomposed by **mineral acids**, which combine with the base, liberating the free fat acid. 2. Aqueous solutions of **metallic salts** give precipitates of metallic oleates with soaps. 3. Soap is frequently alkaline, and when so it makes a black mixture with **calomel**, due to the mercurous oxide formed. 4. It may precipitate hydrates or oxides from solutions of metallic salts.

**Soda.**—Sodium hydrate has the incompatibilities of the fixed alkali hydrates. [See HYDRATES, FIXED ALKALI.]

**Sodii Arsenas.**—Sodium arsenate is frequently alkaline. [See ACIDUM ARSENICUM.]

**Sodii Benzoas.**—[See ACIDUM BENZOICUM.]

**Sodii Boras.**—1. A saturated solution of borax gelatinizes mucilage of **acacia**. [See ACACIA, No. 5.] 2. Borax is alkaline in reaction and precipitates **metallic compounds** and **alkaloids** from solutions of their salts. Glycerin prevents this by decomposing the borax. 3. **Glycerin** and borax react in the presence of water, liberating boric acid. [See GLYCERINUM, No. 1.] **Glucose**, some other forms of **sugar**, and **honey** cause a similar reaction. 4. When triturated with **alum**, borax forms a damp powder or sticky mass. Chemical reaction takes place and the water of crystallization is liberated. 5. Borax liberates chloroform from a solution of **chloral hydrate**. 6. **Sugar** makes borax more soluble in

water (W. D., XVII. 61). 7. Borax increases the solubility in water of **boric**, **benzoic**, **salicylic**, and **stearic acids**, various **resins**, and **oils**. 8. Borax forms with many of the weaker **acids**, double salts in which the boric acid appears to act the part of a base. 9. When **tartaric acid** and borax are mixed in solution in proper proportions boric acid separates; if the quantity of tartaric acid is gradually increased, the quantity of boric acid also increases up to a certain point, beyond which it diminishes (Watts, I. 648). [See ACIDUM BORICUM.]

**Sodii Bromidum.** [See ACIDUM HYDROBROMICUM.]

**Sodii Carbonas.** [See CARBONATES.]

**Sodii Chloridum.** [See ACIDUM HYDROCHLORICUM.]

**Sodii Hypophosphis.** [See ACIDUM HYPOPHOSPHOROSUM.]

**Sodii Hyposulphis.** [See SODII THIOSULPHAS.]

**Sodii Iodium.** [See ACIDUM HYDRIODICUM.]

**Sodii Nitris.** [See ACIDUM NITROSUM.]

**Sodii Phosphas.**—1. The official sodium phosphate is slightly alkaline in reaction, and precipitates some of the **alkaloids** from aqueous solutions of their salts, and also neutral solutions of salts of nearly all common **metals**. 2. Sodium phosphate gives a liquid or soft mass when rubbed with **acetamid**, **carbolic acid**, **chloral hydrate**, **lead acetate**, **pyrocatechin**, **pyrogallol**, or **salicylic acid**. It forms a slightly damp powder with **antipyrin**, **resorcin**, or **sodium salicylate**. [See ACIDUM PHOSPHORICUM.]

**Sodii Pyrophosphas.** [See pyrophosphoric acid under ACIDUM PHOSPHORICUM.]

**Sodii Salicylas.** [See ACIDUM SALICYLICUM.]

**Sodii Sulphas.** [See ACIDUM SULPHURICUM.]

**Sodii Thiosulphas.**—1. Sodium thiosulphate (hypo-sulphite) in aqueous solution is decomposed by nearly all **acids**, forming sulphur, and sulphurous acid. 2. Aqueous solutions of thiosulphates are decomposed into hydrogen sulphide and sulphuric acid when boiled (M. & M., IV. 705).

3. Sodium thiosulphate precipitates, as thiosulphates, solutions of **barium chloride**, **silver nitrate**, **lead acetate**, and **mercurous nitrate**. The precipitates are white, but those of the last three salts turn black on standing, forming the sulphide of the metal and sulphuric acid. 4. Sodium thiosulphate with a solution of **ferric chloride** gives a dark violet color, due to ferric thiosulphate. The solution soon loses its color because the salt formed changes to ferrous sulphate. 5. In acid solution sodium hyposulphite reduces **iodine** to hydriodic acid; 6. **chlorates** to chlorine and hydrochloric acid; 7. **chromates** to chromic salts; 8. **permanganates** to manganic salts; 9. **arsenic** compounds to arsenous. 10. Sodium thiosulphate forms double thiosulphates with many **metallic salts**. 11. Solutions of sodium thiosulphate dissolve **silver iodide**, **silver bromide**, **silver chloride**, **mercuric iodide**, and other salts (Watts, v. 630). 12. In very dilute solutions it prevents the precipitation of some of the alkaloids by **gold chloride**. It combines with the gold to form a double thiosulphate. 13. An acidulated solution bleaches **vegetable colors** on account of its reducing properties. 14. When sodium thiosulphate is triturated with **potassium chlorate**, **nitrate**, or **permanganate**, or other strong **oxidizing agents**, explosion is liable to take place.

**Spiritus.—Water** causes a separation of the volatile substance from all of the official spirits except spirit of nitrous ether, spirit of ammonia, whiskey, and brandy. They all contain alcohol and consequently have the reactions of alcohol.

**Spiritus Ætheris Compositus.** [See OLEUM ÆTHE-REUM.]

**Spiritus Ætheris Nitrosi.**—1. The ethyl nitrite in the spirit of nitrous ether is decomposed by **alkali hydrates**, forming alcohol and a nitrite of the alkali. 2. The spirit of nitrous ether readily undergoes decomposition, forming alcohol, aldehyde, nitrous acid, nitric acid, and other products.



3. The spirit has the incompatibilities mentioned under nitrous acid. [See ACIDUM NITROSUM.]

**Spiritus Ammoniae.**—Spirit of ammonia has the same incompatibilities as water of ammonia, except as they are modified by the alcohol. With solutions of alkaloidal salts the ammonia liberates the alkaloids, but the alcohol has a tendency to keep them in solution. [See HYDRATE, VOLATILE ALKALI.]

**Spiritus Ammoniae Aromaticus.**—The incompatibilities of this preparation are similar to those of the spirit of ammonia, and in addition the ammonium carbonate with acids liberates carbon dioxide. Aqueous or weak alcoholic liquids cause the separation of the aromatic oils.

**Spiritus Camphoræ.** [See CAMPHORA and SPIRITUS.]

**Spiritus Frumenti.**—Whiskey usually contains a little tannic acid.

**Spiritus Gaultheriæ.** [See METHYL SALICYLAS and SPIRITUS.]

**Spiritus Glonoini.**—If the alcohol is allowed to evaporate the nitroglycerin may become sufficiently concentrated to cause explosion when struck. [See GLONOINUM and SPIRITUS.]

**Spiritus Vini Gallici.**—Brandy usually contains a little acetic and tannic acids.

**Stramonium.** [See ATROPINA.]

**Strontii Bromidum.** [See STRONTIUM and ACIDUM HYDROBROMICUM.]

**Strontii Lactas.** [See STRONTIUM and ACIDUM LACTICUM.]

**Strontium.**—1. Salts of strontium in aqueous solution are precipitated by the soluble **carbonates**, **phosphates**, or **oxalates** as strontium carbonate, phosphate, or oxalate. 2. The soluble **sulphates**, **chromates**, or **alkali hydrates** precipitate from concentrated solutions the strontium sulphate, chromate, or hydrate.

**Strychnina.**—1. Strychnine combines with **acids** to

form salts. 2. Strychnine salts in aqueous solution are precipitated by the reagents mentioned under ALKALOIDS, Nos. 2 and 3. 3. In rather strong solutions of strychnine sulphate the soluble **chlorides**, **bromides**, and especially the **iodides** are liable to cause precipitation of the strychnine. The precipitation may not take place for several days. In explaining the cause of the trouble several factors must be taken into consideration. Frequently the commercial samples of the alkali iodides and bromides are alkaline from the carbonate which was left in to aid their keeping, and this alkali would liberate and precipitate the strychnine. The compound which potassium iodide forms with strychnine is only sparingly soluble in water, but the corresponding compounds formed with potassium chloride and bromide are more soluble. Some writers partially explain the precipitation by saying that the compounds formed are less soluble in water containing the inorganic salts than they are in water alone. Alcohol tends to prevent the precipitation. 4. **Hydrochloric acid** added to a solution of strychnine hydrochloride gives a crystalline precipitate (M. & M., IV. 517). 5. Alkaline substances like **sodium phosphate**, **potassium cyanide**, **sodium arsenate**, and **Fowler's solution** will cause a precipitation when added to an aqueous solution of a strychnine salt. 6. Precipitation by **gold chloride** is prevented to some extent by adding to the gold chloride an equal weight of sodium thiosulphate. [See AURI ET SODII CHLORODI, No. 1.] 7. Strong **nitric acid** if hot converts the alkaloid into the yellow explosive compound which is probably the nitrate of nitrostrychnine (Watts, v. 440). 8. One dram of dilute **nitrohydrochloric acid** with seven drams of water containing one fourth of a grain of strychnine sulphate gives a yellow coloration in a few days. In stronger solutions the change takes place more quickly. The chemical products have not been definitely determined. 9. **Potassium permanganate** in alkaline solution yields ammonia, oxalic acid, carbon dioxide, and another crystalline acid, but in acid solution potassium permanganate

gives an amorphous acid with strychnine (M. & M., IV. 517).  
10. The physiological incompatibilities are **atropine**, **aconite**, **morphine**, **chloral hydrate**, **potassium bromide**, **physostigmine**, **hydrocyanic acid**, **amyl nitrite**, **chloroform**, **alcohol**, **digitalis**, **curarine**, **nicotine**, **paraldehyde**, and **urethane**.

**Sulphates.** [See ACIDUM SULPHURICUM.]

**Sulphites.** [See ACIDUM SULPHUROSUM.]

**Sulphonal.**—1. Sulphonal is not readily acted upon by alkalies, acids, or oxidizing agents. 2. It liquefies when triturated with **chloral hydrate**.

**Sulphur.**—Sulphur readily dissolves in hot aqueous solutions of **hydrates** of **potassium**, **sodium**, **barium**, or **calcium**, forming polysulphides and thiosulphates. 2. Triturated dry with strong oxidizing agents, as **potassium chlorate** or **permanganate**, explosion is liable to occur.

**Syrupus Acidi Hydriodici.**—Syrup of hydriodic acid sometimes becomes yellow or brown, due to the formation of iodine. [See SACCHARUM, ACIDUM HYDRIODICUM, and IODUM.]

**Syrupus Allii.**—Syrup of garlic darkens in the light. It contains acetic acid. [See ACIDUM ACETICUM.]

**Syrupus Calcis.** [See SACCHARUM and LIQUOR CALCIS.]

**Syrupus Ferri Iodidi.**—Syrup iodide of iron has the incompatibilities of soluble iodides and of ferrous salts, modified by the presence of sugar. [See FERROSUM and ACIDUM HYDRIODICUM.]

**Syrupus Hypophosphitum.** [See ACIDUM HYPOPHOSPHOROSUM.]

**Syrupus Ipecacuanhæ.**—Syrup of ipecac contains acetic acid.

**Syrupus Scillæ.**—Syrup of squills contains acetic acid.

**Tannates.** [See ACIDUM TANNICUM.]

**Tartrates.** [See ACIDUM TARTARICUM.]

**Terebenum.**—1. Terebene on exposure to **air** and **light** resinifies and becomes acid. 2. It combines with

**chlorine, bromine, and iodine** to form additive products. 3. In many reactions it resembles oil of turpentine.

**Theobromina.**—1. Theobromine acts like a weak base, and also like a weak acid. 2. It combines with strong **acids** to form salts that are quite readily decomposed by water. 3. It dissolves in an excess of an **alkali hydrate** solution. 4. From an aqueous solution theobromine gives a crystalline precipitate with **silver nitrate, mercuric chloride, and gold chloride**. 5. With many of the general **alkaloidal reagents** it gives no precipitate.

**Thiol.**—Thiol is precipitated from its aqueous solutions by **alkali hydrates, mineral acids, and metallic salts** (Coblenz, 77).

**Thymol.**—1. Thymol unites with **alkalies** to form soluble salts (U. S. D., 1360). 2. With excess of **bromine water** solutions of thymol yield a yellowish-white precipitate of a bromo-derivative, which gradually collects to form globules of a yellowish liquid (Allen, II. 449). 3. A solution of thymol with **iodine** and potassium hydrate gives a red amorphous precipitate of iodothymol (M. & M., IV. 715). 4. **Spirit of nitrous ether** gives a green and then a brown color, changing the thymol to nitroso-thymol. 5. Thymol absorbs **ammonia-gas** and becomes liquid (M. & M., IV. 715). 6. Thymol reduces **gold** and **platinum** from solutions of their salts. 7. **Chromic acid** oxidizes thymol to thymoquinone (M. & M., IV. 715). 8. Thymol gives a liquid or soft mass when rubbed with **acetamid, acetanilid, antipyrin, borneol, camphor, monobromated camphor, carbolic acid, chloral alcoholate, chloral hydrate, euphorin, exalgin, menthol, pyrocatechin, quinine sulphate, resin, salol, or urethane**. It is said to liquefy with **butyl chloral hydrate**.

**Tinctura Ferri Chloridi.**—Tincture of ferric chloride contains free hydrochloric acid. [See FERRICUM and ACIDUM HYDROCHLORICUM.]

**Tinctura Iodi.**—An old tincture of iodine usually con-

tains some hydriodic acid, which prevents the precipitation of the iodine when water is added. [See IODUM.]

**Tolypyrin.**—Tolypyrin gives the same color reactions with **ferric chloride** and spirit of **nitrous ether** as antipyrin (Coblentz, 79).

**Tragacantha.**—1. Tragacanth is colored yellow by a solution of **sodium hydrate** (Allen, I. 355). 2. An aqueous mixture is thickened by **alcohol**, and by **neutral** and **basic lead acetate** (not coagulated by borax, silicates, or ferric salts) (Allen, I. 355).

**Trional.**—1. Trional when rubbed with **chloral hydrate** or **salol** gives a liquid or soft mass.

**Urea.**—Urea becomes soft or liquid when triturated with **bromal hydrate**, **chloral alcoholate**, **chloral hydrate**, **lead acetate**, **pyrocatechin**, or **pyrogallol**.

**Urethanum.**—1. Urethane in the presence of **iodine** and an **alkaline hydrate** or **carbonate** produces iodoform. 2. Urethane with an alcoholic solution of **potassium hydrate** gives large crystals of potassium cyanate (M. & M., I. 679). 3. When urethane is triturated in a mortar with **acetamid**, **antipyrin**, **borneol**, **bromal hydrate**, **butyl chloral hydrate**, **camphor**, **carbolic acid**, **chloral alcoholate**, **chloral hydrate**, **euphorin**, **exalgin**, **menthhol**, **naphtol**, **pyrocatechin**, **pyrogallol**, **resin**, **resorcin**, **salicylic acid**, **salol**, **thymol**, or **benzoic acid**, a liquid is produced.

**Vinum.**—Wine generally contains some tannic acid. [See ACIDUM TANNICUM and ALCOHOL.]

**Vitellus.** [See ALBUMIN.]

**Zinci Chloridum.**—Zinc chloride, like gold and mercuric chlorides, has a strong tendency to combine with **organic bases**, as strychnine, morphine, and quinine (U. S. D., 1469). [See ZINCUM and ACIDUM HYDROCHLORICUM.]

**Zinci Sulphas.** [See ZINCUM and ACIDUM SULPHURICUM.]

**Zincum.**—1. Zinc salts in aqueous solutions are precipitated by the fixed **alkali hydrates** as zinc hydrate which is

soluble in excess of the alkali hydrate. 2. Zinc salts are precipitated by soluble **carbonates, phosphates, arsenates, or cyanides**, as the basic carbonate, phosphate, arsenate, or cyanide. 3. **Borax** gives a precipitate of zinc borate or a mixture of the borate and hydrate. 4. **Tannic acid** gives a precipitate with concentrated solutions of zinc salts. 5. Zinc salts coagulate **albumin**.

## PART II.

### *PRESCRIPTIONS WITH CRITICISMS.*

IN studying the following prescriptions the student should try to make out for himself, so far as possible, wherein the trouble lies, and what he would do to prevent or remedy it, before referring to the notes. In order not to overlook any of the incompatibilities it is suggested that he find out what effect, if any, the first ingredient may have on each of the others; then the second ingredient, the third, and so on. Then, taking the prescription as a whole, he should determine the color that will be produced, the nature and color of the precipitate, how one incompatibility will be modified by another, etc. The student should practice translating the Latin into English, and the English into Latin. The majority of prescriptions which follow should be filled, unless in the reaction there is some more active or dangerous compound formed. It must not be forgotten that a variation in the proportions of ingredients modifies the results of combination.

**1.**

℞ Hydrargyri chloridi cor., gr. ij  
 Potassii iodidi, ʒ ij  
 Syrupi rhei aromatici, f. ʒ iv  
 Elixiris cinchonæ, f. ʒ iv  
 Misce et signa: Teaspoonful  
 three times a day.

**2.**

℞ Quininæ sulphatis, gr. xx  
 Acidi sulphurici aromat., f. ʒ ss  
 Ammonii carbonatis, ʒ j  
 Syrupi aurantii, q. s. ad f. ʒ iv  
 M. S. Cochleare parvum  
 t. i. d.

**3.**

℞ Calomel, gr. vj  
 Potassium chlorate, ʒ j  
 Sugar, powd., ʒ j  
 Mix and make six powders.  
 Label: One every two hours.

**4.**

℞ Ammonii carbonatis, ʒ iiss  
 Syrupi tolutani,  
 Syrupi scillæ, aa. f. ʒ ij  
 Misce et fiat solutio.  
 Sig. Teaspoonful when cough-  
 ing.

## 5.

℞  
 Quininae sulphatis, ℥ ij  
 Olei carophylli, gtt. ij  
 Potassii permanganatis, gr. iij  
 Acidi sulphur. aromat., f. ℥ ij  
 Mucilag. acaciae, q. s. ad f. ℥ viij  
 M. S. Teaspoonful every  
 three hours.

## 6.

℞  
 Tincturæ guaiaci,  
 Muc. acaciae, aa. f. ℥ j  
 M. S. Teaspoonful every  
 three hours.

## 7.

℞  
 Bismuthi subnitratis, ℥ ij  
 Sodii hypophosphitis, ℥ j  
 Extracti nucis vomicae, gr. v  
 Misce, fiat pulvis et divide in  
 partes aequales No. xxv.

## 8.

℞  
 Hydrargyri chloridi cor., gr. ¼  
 Sodii iodidi,  
 Ammonii iodidi, aa. ℥ ij  
 Potassii chloratis, ℥ j  
 Aquæ, f. ℥ j  
 Syrupi sarsaparillæ co., f. ℥ iv  
 M. S. Teaspoonful in wine-  
 glass of water after each meal.

## 9.

℞  
 Potassium chlorate, gr. xl  
 Sodium hypophosphite, gr. xxx  
 Water, enough to make f. ℥ xx  
 Mix and label: Use as gar-  
 gle.

## 10.

℞  
 Borax,  
 Zinc sulphate, aa. ℥ ss  
 Mix. Dissolve one teaspoon-  
 ful in cup of water.

## 11.

℞  
 Extracti buchu fl., f. ℥ ss  
 Spiritus ætheris nitrosi, f. ℥ j  
 Potassii acetatis, ℥ ij  
 Syrupi, q. s. ad f. ℥ iv  
 Misce et signa: Teaspoonful  
 half hour after meals.

## 12.

℞  
 Tinct. digitalis, f. ℥ ij  
 Tinct. ferri chloridi, f. ℥ iss  
 Acidi phosphorici diluti, f. ℥ j  
 Aquæ, q. s. ad f. ℥ ij  
 M. S. Teaspoonful in some  
 water twice a day.

## 13.

℞  
 Quininae sulphatis, gr. xx  
 Plumbi acetatis, gr. xl  
 Bismuthi subnitratis, ℥ ss  
 Syrupi aurantii cort.,  
 q. s. ad f. ℥ iv  
 M. S. Teaspoonful every four  
 hours.

## 14.

℞  
 Sugar of lead, ℥ ss  
 Alum, gr. xv  
 Rose water, f. ℥ iv  
 Mix and label: Lotion.

## 15.

℞  
 Quininae sulph., gr. xvj  
 Acidi tannici, ℥ j  
 Acidi sulphurici arom., ℥ v  
 Syr. eriodictyi arom.,  
 q. s. ad f. ℥ ij  
 M. S. Teaspoonful twice a  
 day.



## 16.

℞  
 Olei morrhue, f. ̄j  
 Syr. ferri iodidi, f. ̄j  
 Olei gaultheriæ, ℥v  
 Syrupi, f. ̄xv  
 Liquoris calcis, f. ̄j  
 M. S. Dessertspoonful twice  
 a day.

## 17.

℞  
 Liq. arseni et hydrarg. iodidi,  
 10 Cc.  
 Potassii iodidi, 5 Gm.  
 Quininæ sulphatis, 2 Gm.  
 Acidi sulphurici aromat., q. s.  
 Syrupi, q. s. ad 300 Cc.  
 M. S. 4 Cc. after each meal.

## 18.

℞  
 Sodii salicylatis, gr. xx  
 Quininæ sulphatis, gr. xx  
 Syrupi zingiberis, f. ̄ij  
 M. S. Teaspoonful doses.

## 19.

℞  
 Liquoris acidi arsenosi, f. ̄j  
 Hydrargyri chlor. cor., gr. j  
 Strychninæ sulphatis, gr. j  
 Spiritus vini rectificati, f. ̄j  
 Aquæ, f. ̄j  
 Misce. Signa: Teaspoonful  
 night and morning.

## 20.

℞  
 Potassii bromidi, ̄ij  
 Chloralis, ̄iv  
 Elixiris aromatici, q. s. ad f. ̄ij  
 M. S. Take one teaspoonful  
 at night.

## 21.

℞  
 Plumbi subacetatis, ̄ss  
 Zinci sulphatis, gr. xl  
 Tinct. catechu co.,  
 Tincturæ opii, aa. f. ̄ss  
 Aquæ, q. s. ad f. ̄viij  
 M. S. Injection. Shake well  
 before using.

## 22.

℞  
 Hydrargyri chloridi cor., gr. iij  
 Albuminis, ̄iss  
 Aquæ, q. s. ad f. ̄x  
 Misce et cola.  
 Signa: Teaspoonful three times  
 a day.

## 23.

℞  
 Sodii phosphatis, ̄v  
 Syrupi rhei, f. ̄iv  
 Syrupi, f. ̄ss  
 Aquæ, q. s. ad ̄ij  
 M. S. Teaspoonful in a little  
 water before meals.

## 24.

℞  
 Ammonii carbonatis, gr. xx  
 Ammonii chloridi, gr. xxx  
 Syrupi allii, f. ̄j  
 Aquæ, q. s. ad f. ̄ij  
 M. S. One-half teaspoonful  
 as required.

## 25.

℞  
 Sodii boratis, gr. x  
 Zinci sulphatis, gr. ij  
 Aquæ camphoræ, f. ̄j  
 Aquæ rosæ, q. s. ad f. ̄j  
 M. S. Put one drop in each  
 eye night and morning.

## 26.

℞  
 Syrupi scillæ,  
 Syrupi ipecac., aa. f. 3 j  
 Syrupi eridictyi arom., f. 3 ij  
 Potassii iodidi, ℥ j  
 Spiritus ætheris nit., f. 3 ij  
 Glycerini, f. 3 iv  
 Syrupi acidi citrici,

q. s. ad f. 5 iij

Misce. Signa: Teaspoonful  
 when coughing.

## 27.

℞  
 Tinct. ferri chlor., f. 5 j  
 Tinct. iodi comp.,  
 Liq. pot. arsenit.,  
 Ac. phosphor. dil., aa. f. 3 iv  
 Quininæ sulph., 3 j  
 Rhei pulv., 5 ss  
 Aquæ, q. s. ad f. 5 viij  
 Misce. Sig. Teaspoonful after  
 meals.

## 28.

℞  
 Quinine sulphate, 3 j  
 Strychnine sulphate, gr. j  
 Sulphuric acid dil., 3 ij  
 Iron pyrophosphate, sol., 3 j  
 Syrup ginger,  
 enough to make f. 5 vj  
 Mix. Teaspoonful three times  
 a day.

## 29.

℞  
 Iodine, gr. xxx  
 Spirit of camphor, f. 5 j  
 Soap liniment, f. 5 iij  
 Mix and label: Apply as di-  
 rected.

## 30.

℞  
 Pepsini saccharati, 3 ij  
 Bismuthi et ammon. cit., 3 j  
 Acidi hydrochlorici dil., gtt. xl  
 Aquæ, f. 5 ij  
 Misce et fiat solutio.  
 Sig. Dose, one teaspoonful.

## 31.

℞  
 Sodii hypophosphitis, gr. xx  
 Acidi sulphurosi, 5 j  
 Aquæ cinnamomi, q. s. ad f. 5 ij  
 M. S. Teaspoonful for vom-  
 iting.

## 32.

℞  
 Hydrargyri chlor. mit., gr. ij  
 Potassii iodidi, gr. xl  
 Misce et fiat pulvis et in char-  
 tulas decem divide.  
 Signa: One powder after each  
 meal.

## 33.

℞  
 Tinct. nucis vom.,  
 Acidi nitromur., aa. f. 3 ij  
 Elixiris quininæ co., N. F.,  
 f. 5 iiii ss  
 M. S. Teaspoonful in an  
 ounce of water after meals.

## 34.

℞  
 Quininæ sulphatis, 3 ss  
 Potassii iodidi, 3 j  
 Strychninæ sulph., gr. v  
 Tinct. cardam. co.,  
 Syr. zingiber., aa. f. 5 ij  
 Aquæ fontanæ, q. s. ad O. ss  
 M. S. Take one tablespoon-  
 ful night and morning.

## 35.

℞  
 Ammonii carbonatis, 3 j  
 Syrupi ipecacuanhæ, f. 3 j  
 Vini pepsini,  
 Misturæ amygdalæ, aa. f. 3 j  
 M. S. Teaspoonful in milk  
 every three hours.

## 36.

℞  
 Potassii chloratis, gr. iv  
 Sulphuris præcip., gr. vj  
 Antimonii sulphur., gr. j  
 Sacchari, gr. x  
 Tere. Fiant chartulæ 2.  
 Signa : Insufflation.

## 37.

℞  
 Vini ipecacuanhæ, f. 3 iij  
 Syrupi scillæ, f. 3 vj  
 Olei terebinthinæ, f. 3 iss  
 Tinct. opii camphorata, f. 3 v  
 Liquoris ammonii acet., f. 5 iss  
 Syrupi, q. s. ad f. 5 iv  
 M. S. Teaspoonful three times  
 a day.

## 38.

℞  
 $C_{18}H_{21}NO_3$ , gr. 14  
 KI, dr. 2½  
 $C_3H_5O_3$ , oz. 1½  
 $H_2O$ , oz. 2  
 M. S. Teaspoonful every  
 four hours.

## 39.

℞  
 Potassium chlorate, ʒ ss  
 Fluid hydrastis colorless, f. 3 ss  
 Carbolic acid, gtt. v  
 Tincture of myrrh, f. 3 ss  
 Peppermint water,  
 q. s. ad f. 3 iij  
 Mix and label : Gargle.

## 40.

℞  
 Copaibæ,  
 Tinct. ferri chlor.,  
 Tinct. cantharid., aa. 10 Cc.  
 Glycerini, 20 Cc.  
 Syrupi, 50 Cc.  
 M.

## 41.

℞  
 Camphoræ,  
 Chloralis, aa. 5 Gm.  
 Cocainæ hydrochloratis, 5 Dg.  
 M. S. To be applied exter-  
 nally as directed.

## 42.

℞  
 Chloroformi,  
 Acidi nitrici,  
 Creosoti, aa. f. 3 ij  
 M. S. For cauterizing.

## 43.

℞  
 Sodii boratis, 3 ij  
 Chloralis, 3 j  
 Alcoholis, f. 5 ss  
 Aquæ, q. s. ad f. 5 vj  
 Misce et fiat lotio.

## 44.

℞  
 Liquor. ferri chloridi, f. 3 ij  
 Potassii chloratis, gr. xxx  
 Glycerini, f. 3 j  
 M. S. Teaspoonful twice a  
 day.

## 45.

℞  
 Potassii chloratis, 3 ij  
 Acidi hydrochlorici, f. 3 ij  
 Aquæ, f. 5 viij  
 M. S. Gargle.

## 46.

℞  
 Tinct. cimicifugæ, f. 3 vj  
 Tinct. sanguinariæ, f. 3 ss  
 Tinct. lobeliæ, f. 3 iss  
 Syrupi tolutani, f. 3 ij  
 Syrupi scillæ co., q. s. ad f. 3 iij  
 M. S. Tablespoonful every  
 hour until cough is relieved.

## 47.

℞  
 Iodoform,  
 Tannic acid, aa. 3 ij  
 Mix and label: Dust over  
 abraided surface.

## 48.

℞  
 Ammonii carbonatis, 3 j  
 Hydrarg. chlor. mitis, gr. xij  
 M. Ft. capsulæ No. viii.  
 Sig. One every three hours.

## 49.

℞  
 Potassii cyanidi, 3 j  
 Morphinae acet., gr. ij  
 Acidi acetici, gtt. ij  
 Syrupi, q. s. ad f. 3 viij  
 M. S. Cochleare parvum ter  
 in die.

## 50.

℞  
 Tincturæ ferri chloridi, f. 3 ij  
 Spiritus ætheris nitrosi, f. 3 iv  
 Mucilaginis acaciæ, f. 3 j  
 Syrupi, q. s. ad f. 3 iij  
 M. S. Teaspoonful three  
 times a day.

## 51.

℞  
 Potassii citratis, 3 vj  
 Potassii bicarbonatis, 3 iij  
 Liquoris potassæ, f. 3 ij  
 Ext. buchu fluidi, f. 3 vj  
 Spiritus ætheris nitrosi, f. 3 iv  
 Syrupi limonis, q. s. ad f. 3 vj  
 M. S. Tablespoonful three  
 times a day.

## 52.

℞  
 Bichloride of mercury, gr. j  
 Sodium arsenite, gr. ss.  
 Strychnine sulphate, gr. ss.  
 Carbonate of potass.,  
 Dried sulphate of iron, aa. gr. ix  
 Mix and divide into nine pills.  
 Label: One after each meal.

## 53.

℞  
 Antipyrin, gr. xx  
 Calomel, gr. x  
 Sodium bicarb., 3 j  
 Mix and make 20 powders.

## 54.

℞  
 Sodii salicylatis, 3 iiss  
 Syrupi limonis, f. 3 ij  
 M. S. Teaspoonful three times  
 a day.

## 55.

℞  
 Potassii iodidi, 3 ij  
 Spiritus ætheris nit., f. 3 j  
 Tinct. ferri chloridi, f. 3 iss  
 Tinct. gentianæ co., f. 3 iss  
 Glycerini, f. 3 ss  
 Aquæ, q. s. ad f. 3 iv  
 M. S. Teaspoonful three times  
 a day before meals.

56.

℞  
Fowler's solution, f. ʒ ij  
Sol. of dialyzed iron, f. ʒ iv  
Mix. Label: Teaspoonful  
after meals.

57.

℞  
Liq. strychninæ, B. P., 1.5 Cc.  
Sodii bicarbonatis, 3.0 Gm.  
Aquæ, q. s. ad 100.0 Cc.  
Misce et signa: Teaspoonful  
three times a day.

58.

℞  
Liquoris potass. arsenitis, f. ʒ j  
Hydrargyri chloridi cor., gr. j  
Aquæ, f. ʒ iv  
Misce et fiat sol. Sig. Dessert-  
spoonful three times a day.

59.

℞  
Quininæ sulph., gr. x  
Potassii acetatis, gr. xx  
Acidi sulphurici dil., gtt. iv  
Aquæ cinnamomi, q. s. ad f. ʒ j  
M. S. Teaspoonful after  
meals.

60.

℞  
Strychninæ hydrochlor., gr. j  
Tinct. cinchonæ, f. ʒ j  
Liq. ferri dialysati, f. ʒ ss  
Liq. potassii arsenitis, f. ʒ ij  
Syrupi, f. ʒ iij  
Aquæ, q. s. ad f. ʒ vj  
M. S. Capiat cochleare par-  
vum post prandium.

61.

℞  
Quininæ sulph., ʒ j  
Morphinæ sulph., gr. iij  
Strychninæ sulph., gr. ʒ  
Acidi arsenosi, gr. 1 1/6  
Ext. belladonnæ, gr. v  
Aconitinæ, gr. ij  
Ferri bromidi, ʒ j  
M. Ft. pil. No. xxiv.

62.

℞  
Strychnine sulph., gr. 1/2  
Dil. nitrohydrochlor. acid, ʒ ij  
Water, to make ʒ j  
Mix. Label: Thirty drops  
after meals.

63.

℞  
Liq. ammonii acet.,  
Syrupi ferri iodidi, aa. f. ʒ ss  
Syrupi tolutani, f. ʒ ij  
Hydrarg. chlor. corrosivi, gr. ss  
Creosoti, f. ʒ ss  
M.

64.

℞  
Iodoformi, gr. xx  
Acidi carbolici, gr. xxx  
Zinci oxidi,  
Balsami peruvi.,  
Petrolati mol., aa. ʒ j  
M. S. Apply as directed.

65.

℞  
Potassium iodide,  
Fowler's solution, aa. ʒ ss  
Mix. Take five drops in a  
little water three times a day.

## 66.

R Carbohc acid, cryst.,  
 Euphorin,  
 Aristol,  
 Tannic acid,  
 Dried alum, aa. gr. xl  
 Cacao butter,  
 a sufficient amount  
 Make suppositories No. XL.

## 67.

R Quininæ sulph., gr. xvj  
 Aquæ, f. 3 ij  
 Acidi sulphurici dil., q. s.  
 Ext. glycyrrhizæ fl.,  
 q. s. ad f. 3 ij  
 M. et ft. mist.

## 68.

R Tinct. ferri chlor., f. 3 iv  
 Potassii chloratis, 3 j  
 Glycerini, f. 3 j  
 Ext. glycyrrhizæ fl., f. 3 j  
 Aquæ, q. s. ad f. 5 iv  
 M. S. One teaspoonful four  
 times a day.

## 69.

R Ferri reducti, 3. o Gm.  
 Acidi arsenosi, 0.35 Gm.  
 Quininæ sulph., 8. o Gm.  
 Strychninæ sulph., 0.35 Gm.  
 Extracti gentianæ, 8. o Gm.  
 M. Ft. pil. No. XL.

## 70.

R Acidi carbolici, 3 iss  
 Aquæ, q. s. ad 3 j  
 M. S. Use with camel-hair  
 brush.

## 71.

R Liq. ammonii acet., f. 3 iv  
 Acidi acetici, f. 3 j  
 Tinct. ferri chlor., f. 3 ss  
 Glycerini, f. 3 ss  
 Mucilaginis acaciæ, f. 3 iij  
 M. S. Teaspoonful every  
 three hours.

## 72.

R Hydrarg. chlor. cor., gr. iij  
 Muc. acaciæ, 3 j  
 Aquæ,  
 Liquoris calcis, aa. 3 ij  
 M.

## 73.

R Syrupi acidi hydriodici, f. 3 ij  
 Bismuthi subnit., 3 iss  
 M. S. Teaspoonful three times  
 a day.

## 74.

R Sodii bicarbonatis, 3 ij  
 Pepsini, gr. xxiv  
 Sodii bromidi, 3 j  
 Rhei pulv., gr. xxxij  
 M. Ft. chart. No. XII.

## 75.

R Sodii phosphatis, gr. xxx  
 Strychninæ sulph., gr. ss  
 Syr. aurantii corticis, 3 ij  
 M. S. Teaspoonful three times  
 a day.

## 76.

R Alcohol, 3o Cc.  
 Iodine, 1o Gm.  
 Turpentine, 200 Cc.  
 Mix. To be used as a spray.

## 77.

℞ Hall's sol. of strych., f. ʒ ij  
 Fowler's sol. of arsenic, f. ʒ ij  
 Alcohol, f. ʒ iiss  
 Mix. Label: Teaspoonful in  
 half glass of water after meals.

## 78.

℞ Tinct. myrrhæ, f. ʒ ij  
 Morph. acetatis, gr. ij  
 Acidi tannici, ʒ ss  
 Syr. zingiberis, ʒ iiss  
 Misce et fiat sol.  
 Sig. Teaspoonful at 6, 8, and  
 10 o'clock P.M.

## 79.

℞ Hydrargyri chlor. cor., .5 Gm.  
 Ammonii carbonatis, 2.5 Gm.  
 Potassii iodidi, 2.5 Gm.  
 Aquæ, q. s. ad 150 Cc.  
 M. S. Dilute with three times  
 its volume of water and use as  
 directed.

## 80.

℞ Potassii chloratis, ʒ ij  
 Syr. ferri iodidi, f. ʒ ij  
 Vini antimonii, f. ʒ ss  
 Spt. chloroformi, f. ʒ ij  
 Aquæ, q. s. ad f. ʒ viij  
 M. S. Teaspoonful three times  
 a day.

## 81.

℞ Liq. ammonii acetatis, f. ʒ ij  
 Aq. camphoræ, f. ʒ iiss  
 Spiritus ætheris nit., f. ʒ ss  
 Antimonii et pot. tart., gr. ss  
 Morphinae acetatis, gr. ss  
 M.

## 82.

℞ Potassii chloratis, 1.0 Gm.  
 Potassii salicylatis, 0.5 Gm.  
 Cinchonæ pulv., 3.0 Gm.  
 Carbonis ligni, 5.0 Gm.  
 M. Divide into 10 powders.  
 S. One just after a meal.

## 83.

℞ Calcii hypophosphitis, 2.5 Gm.  
 Ferri lactatis, ʒ ss  
 Potassii chloratis, 4.0 Gm.  
 M. Ft. pil. No. xxx.

## 84.

℞ Iodine, resublimed, ʒ ij  
 Mercurial oint.,  
 Camphor, aa. ʒ iij  
 Alcohol, f. ʒ ij  
 Water, q. s. ad f. ʒ iv  
 Mix and label: Apply as oint-  
 ment to the neck.

## 85.

℞ Boric acid, ʒ iv  
 Creolin, ʒ j  
 Water, ʒ xv  
 Mix and label: Lotion for the  
 eye.

## 86.

℞ Magnesii carbon., ʒ iiss  
 Sodii boratis,  
 Acidi citrici, aa. ʒ ij  
 Aquæ bullientis, q. s. ad f. ʒ viij  
 M. S. Tablespoonful in the  
 morning before breakfast.

## 87.

℞ Auri et sodii chloridi, gr. xij  
 Strychninae sulph., gr. j  
 Atropinae sulphatis, gr. ʒ  
 Ext. cinchonæ fl., f. ʒ iiij  
 Aquæ, q. s. ad f. ʒ vj  
 M. Ft. sol.

## 88.

℞  
 Morphinae sulph., gr. iv  
 Atropinae sulph.,  
                     32 (1-500 gr.) tablets  
 Aquæ, ̄ iv  
 M. S. Teaspoonful every three  
 quarters of an hour.

## 89.

℞  
 Potassii permanganatis, gr. xx  
 Ext. glycyrrhizæ, gr. xx  
 Glyceriti amyli, q. s.  
 M. Fiant pil. No. xxv.

## 90.

℞  
 Acidi sulphurici, f. 3 j  
 Acidi nitrici, f. 3 j  
 Olei terebinthinæ, f. ̄ ss  
 Alcoholis, f. 3 ij  
 M. S. Caustic.

## 91.

℞  
 Acidi salicylici, aa. ̄ j  
 Sodii bicarbonatis, aa. ̄ j  
 Aquæ, q. s. ad f. ̄ vj  
 M. Ft. sol.  
 Sig. 3 j t. i. d.

## 92.

℞  
 Tinct. ferri chloridi, 10.0 Cc.  
 Acidi phosphorici dil., 10.0 Cc.  
 Quininae sulph., 5.0 Gm.  
 Strychninae sulph., 0.1 Gm.  
 Aquæ dest., 100.0 Cc.  
 Syrupi limonis, 80.0 Cc.  
 M. S. Teaspoonful three times  
 a day.

## 93.

℞  
 Quinine bisulph., 3 ss  
 Antikamnia, 3 j  
 Elixir aromatic, f. 3 xx  
 Mix and label: Two teaspoon-  
 fuls every four hours.

## 94.

℞  
 Tinct. ferri chloridi, 3 iv  
 Acidi carbolici, 3 j  
 Acidi sulphurosi, 3 iij  
 Aquæ, q. s. ad ̄ viij  
 Misce et signa: Gargle.

## 95.

℞  
 Pot. chlorat.,  
 Calc. hypophosphit., aa. gr. xv  
 Magnesii sulphatis, gr. xxx  
 Ferri sulphatis, gr. vj  
 Liq. strychninae, ʒ xx  
 Aquæ, q. s. ad f. ̄ iij  
 Misce et signa: Teaspoonful  
 three times a day.

## 96.

℞  
 Sodium salicylate, gr. x  
 Ammonium carbonate, gr. iij  
 Sp. of nitrous ether,  
 Sp. of chloroform, aa. ʒ x  
 Water, enough to make ̄ j  
 Mix.

## 97.

℞  
 Codeine, gr. ij  
 Dil. phosphoric acid, q. s.  
 Dil. hydrocyanic acid, ʒ xx  
 Tincture of iodine, ʒ x  
 Water, enough to make f. ̄ iv  
 Mix. Label: Tablespoonful at  
 night.

## 98.

℞  
 Calomel, gr. xv  
 Lime water, ̄ iv  
 Mix and apply as directed.

## 99.

℞  
 Hydrargyri chlor. cor., gr. v  
 Glycerini, ̄ ss  
 Liq. calcis saccharati, ̄ j  
 Aquæ, q. s. ad O. j  
 M. S. Lotion.



## 100.

℞ Potassii bromidi, gr. x  
 Antipyrini, gr. v  
 Tinct. ferri chloridi, ℥ x  
 Spiritus chloroformi, ℥ x  
 Aquæ, q. s. ad f. ̄ j  
 M. S. Teaspoonful twice a day.

## 101.

℞ Gold chloride, gr. x  
 Menthol, cryst., ̄ j  
 Comp. tinct. of iodine, f. ̄ v  
 Glycerin, f. ̄ vj  
 Water, q. s. ad f. ̄ ij  
 Mix and label: To be used  
 with an atomizer.

## 102.

℞ Ext. digitalis fl., f. ̄ ij  
 Potassii acetatis, ̄ ij  
 Elixiris, f. ̄ ij  
 Aquæ, q. s. ad f. ̄ vj  
 Misce et signa: Teaspoonful  
 every four hours.

## 103.

℞ Solution of arsenic, Br.P., ℥ cxl  
 Gold and sodium chloride, gr. iss  
 Water, enough to make ̄ j  
 Mix. Label: Teaspoonful after  
 meals.

## 104.

℞ Tinct. ferri chlor., ̄ ss  
 Potassii chloratis, ̄ iv  
 Morphinae sulph., gr. ij  
 Aquæ, ̄ iv  
 M.

## 105.

℞ Codeine sulphate, gr. xij  
 Ammonium bromide, ̄ ss  
 Water, to make f. ̄ ij  
 Mix. Label: Teaspoonful at  
 bedtime.

## 106.

℞ Morph. acetatis, .05 Gm.  
 Potassii iodidi, 2.0 Gm.  
 Ferri sulphatis, 1.0 Gm.  
 Aquæ, 50.0 Cc.  
 M. S. Cochleare parvum om-  
 nibus noctibus.

## 107.

℞ Bismuthi subnit., ̄ j  
 Sodii bicarbonatis, gr. xxx  
 M. Fiant pil. No. xx.

## 108.

℞ Potassii bromidi, gr. xv  
 Hydrargyri chlor. mitis, gr. v  
 Misce et fiat pulvis; mitte  
 tales No. xii.

## 109.

℞ Plumbi acetatis, ̄ ss  
 Zinci sulphatis, gr. xv  
 Aquæ rosæ, q. s. ad f. ̄ iv  
 Misce et signa: Injection.

## 110.

℞ Aq. hydrogenii dioxidi, ̄ j  
 Zinci sulphatis, ̄ vj  
 Acidi carbolici, ̄ j  
 Glycerini, ̄ j  
 Aquæ, q. s. ad ̄ viij  
 Misce et fiat lotio.  
 Signa: Apply locally.

## 111.

℞ Bismuthi subnit., gr. xx  
 Plumbi subacetatis, gr. xxx  
 Morphinae sulph., gr. j  
 Sodii bicarbon., ̄ j  
 Misce et divide in chartulas  
 decem.  
 Signa: One powder two hours  
 after each meal.

## 112.

℞  
 Iodol, 0.5 Gm.  
 Yellow oxide of mercury, 0.2 Gm.  
 Petrolatum, 10.0 Gm.  
 Mix and make an ointment.

## 113.

℞  
 Antipyrin,  
 Sodium salicylate, aa. gr. xxx  
 Mix and make 15 powders.

## 114.

℞  
 Thymol,  
 Salicylic acid, aa. gr. xxx  
 Menthol, gr. xx  
 Eucalyptol, 3 iss  
 Benzoic acid, 3 j  
 Sodium bicarbonate,  
 Borax, aa. 3 ij  
 Oil of wintergreen, 3 ss  
 Glycerin,  
 Water, aa. q. s. ad f. 5 xvj  
 Mix. Label: Gargle.

## 115.

℞  
 Quininæ sulphatis,  
 Potassii iodidi, aa. gr. viij  
 Ac. nitrohydrochlorici, ℥ xx  
 Aquæ, q. s. ad f. 5 ij  
 M. S. Teaspoonful after meals.

## 116.

℞  
 Quinine bisulphate, 3 ss  
 Basham's mixture, f. 5 iv  
 Mix. Label: Teaspoonful every other hour.

## 117.

℞  
 Hydrastine sulphate, gr. j  
 Boracic acid,  
 Borax, aa. gr. viij  
 Tinct. of opium, gtt. xx  
 Water, f. 5 j  
 Mix. Mark: Put 2 drops in each eye two or three times a day.

## 118.

℞  
 Antipyrin, 3 j  
 Sp. of nitrous ether, f. 3 j  
 Tincture of aconite, gtt. xx  
 Elixir, enough to make f. 5 ij  
 Mix.

## 119.

℞  
 Quininæ sulphatis,  
 Acidi tartarici,  
 Potassii iodidi, aa. gr. xij  
 Aquæ, q. s. ad f. 5 ij  
 Misce. Signa: Cochleare parvum bis vel ter in die sumatur.

## 120.

℞  
 Resorcin, 10 Gm.  
 Glycerin, 15 Gm.  
 Spirit of nitrous ether, 10 Cc.  
 Water, 35 Cc.  
 Mix.

## 121.

℞  
 Acidi carbolic, 3 ij  
 Aquæ ammoniæ, 3 iv  
 Spiritus vini rectificati, 5 j  
 M. S. Use with atomizer.

## 122.

℞  
 Tincturæ aconiti, f. 3 j  
 Tincturæ iodi, f. 3 ij  
 Linimenti saponis,  
 Aquæ ammoniæ, aa. f. 5 ij  
 M. S. Embrocation.

## 123.

℞  
 Quininæ sulphatis, ʒ iss  
 Strychninæ sulphatis, gr. ss  
 Tinct. ferri chloridi, ʒ iss  
 M. S. Half a teaspoonful in  
 a glass of water three times a  
 day

## 124.

℞  
 Tinct. ferri chlor., f. ʒ ij  
 Aquæ gaultheriæ, f. ʒ iij  
 Syrupi tolutani, f. ʒ j  
 M. S. Teaspoonful one half-  
 hour after meals.

## 125.

℞  
 Salol,  
 Thymol, aa. ʒ j  
 Ext. of nux vomica, gr. x  
 Ext. of glycyrrhiza, gr. xv  
 Po. soap, a sufficient quantity.  
 Mix and divide into 20 pills.

## 126.

℞  
 Morphinæ sulph., gr. ij  
 Sp. ætheris nitrosi,  
 Aquæ, aa. f. ʒ ss  
 Misce. Signa: Capiat coch-  
 leare unum parvum quoties re-  
 quiritur.

## 127.

℞  
 Hydrargyri chlor. cor., gr. ss  
 Liq. potass. arsenitis, f. ʒ iss  
 Quininæ sulphatis, gr. x  
 Aq. menth. piper., q. s. ad f. ʒ j  
 M. S. Half teaspoonful three  
 times a day.

## 128.

℞  
 Tinct. ferri chlor., f. ʒ ss  
 Glycerini, f. ʒ iss  
 Aquæ ammoniæ, f. ʒ iij  
 Aquæ, q. s. ad f. ʒ iv  
 Mix and make a solution.

## 129.

℞  
 Liquoris ferri dialysati, f. ʒ iv  
 Syrupi, f. ʒ j  
 Mucilaginis acaciæ, f. ʒ iv  
 Misce.

## 130.

℞  
 Hydrargyri chlor. mitis, ʒ j  
 Ammonii chloridi, ʒ j  
 Misce et divide in partes æqua-  
 les viginti.  
 Sig. Sumat unam bis vel ter  
 in die.

## 131.

℞  
 Acetanilid, gr. xxx  
 Spirit of nitrous ether,  
 Syrup, aa. ʒ j  
 Mix and label: Teaspoonful  
 every hour until fever subsides.

## 132.

℞  
 Amyl nitritis, f. ʒ j  
 Alcoholis, f. ʒ j  
 Potassii iodidi, ʒ j  
 Syrupi limonis, q. s. ad f. ʒ ij  
 Misce. Cito dispensetur!  
 Signetur: A teaspoonful to be  
 taken every hour.

## 133.

℞  
 Ext. valerianæ fl., f. ʒ iss  
 Ext. taraxaci fl., f. ʒ ss  
 Tinct. gentianæ co., f. ʒ iv  
 Magnesii sulphatis, ʒ ij  
 Aquæ, q. s. ad O. ss  
 M. S. Tablespoonful twice a  
 day.

## 134.

℞  
Tincturæ iodi, 3 ij  
Glycerini, 3 j  
Aquæ, q. s. ad 5 ij  
M. S. Apply locally.

## 135.

℞  
Liquoris bismuthi, N. F., f. 3 ss  
Tinct. nucis vomicæ, f. 3 iiiss  
Vini pepsini, f. 5 j  
Elix. gentianæ, q. s. ad f. 5 iv  
M. S. Teaspoonful three times  
a day.

## 136.

℞  
Hydrarg. chlor. mit.,  
Cocainæ hydrochlor., aa. gr. j  
Pepsini, gr. iv  
Aquæ, quantitas sufficiens  
Divide in pilulas numero octo.

## 137.

℞  
Liq. plumbi subacet. dil.,  
Tincturæ opii, aa. f. 5 ss  
Aquæ, f. 5 j  
M. S. Lotion.

## 138.

℞  
Ext. digitalis fl., 8 Cc.  
Ext. erythroxylæ fl., 30 Cc.  
Sp. ætheris nit., 30 Cc.  
Glycerini, 30 Cc.  
Aquæ, q. s. ad 125 Cc.  
M. S. Teaspoonful three times  
a day.

## 139.

℞  
Argenti oxidi, gr. vj  
Creosoti, gtt. vj  
Glycyrrhizæ, q. s.  
M. Make six pills.

## 140.

℞  
Quinine bisulph., gr. xx  
Tincture of catechu co., f. 3 ij  
Water, enough to make f. 5 ij  
Mix. Mark: Teaspoonful  
every hour.

## 141.

℞  
Acidi carbolicæ, 3 Gm.  
Sodii bicarb., 15 Gm.  
Sodii boratis, 15 Gm.  
Glycerini, 35 Cc.  
Aquæ, q. s. ad 1000 Cc.  
Misce. Sig. Use as gargle.

## 142.

℞  
Tinct. guaiaci ammon., f. 3 ij  
Mucilaginis acaciæ, f. 3 ij  
Quininæ sulph., gr. viij  
Ac. sulphurici dil., f. 3 iv  
Potassii bicarb., 3 iss  
Aquæ, q. s. ad f. 5 iv  
M.

## 143.

℞  
Acidi nitrohydrochlorici, 3 vij  
Spiritus terebinthinæ, 5 j  
Make emulsion, 5 iv  
Sig. Teaspoonful three times  
a day.

## 144.

℞  
Potassii permanganatis, 2 Gm.  
Glycerini, 4 Gm.  
Aquæ, q. s. ad 50 Cc.  
M. S. Apply externally.

## 145.

℞  
Spiritus ætheris nit., f. 5 j  
Potassii citratis, 3 ij  
Syrupi, f. 5 j  
M. S. Capiat cochleare par-  
vum post prandium.

## 146.

℞  
 Hydrargyri chlor. cor., gr. ij  
 Infusi cinchonæ, ̄ iv  
 Sp. ammoniæ aromatici, 3 ij  
 M. S. Cochleare minimum  
 bis in die.

## 147.

℞  
 Alum,  
 Zinc sulphate, aa. 3 ij  
 Lead acetate, 3 iss  
 Tannic acid, 3 ss  
 Mix. Label: One to two tea-  
 spoonfuls in a pint of water. Use  
 locally.

## 148.

℞  
 Cocaine hydrochlorate, gr. ij  
 Salicylic acid, ̄ ij  
 Phenacetin,  
 Exalgin, aa. 3 j  
 Mix and make 30 powders.

## 149.

℞  
 Magnesiæ calc., ̄ ss  
 Sodii bicarb., 3 iij  
 Sp. ammoniæ arom., f. 3 iv  
 Tinct. zingiberis, f. 3 iij  
 Syr. tolutani, f. ̄ j  
 Aq. menth. piper., q. s. ad f. ̄ iv  
 M. S. Dessertspoonful after  
 meals.

## 150.

℞  
 Tinct. ferri chloridi, 3 iss  
 Sodii hyposulphitis, 3 iss  
 Potassii chloratis, 3 iij  
 Quininæ sulphatis, gr. xv  
 Aquæ, f. ̄ ij  
 M. S. Teaspoonful three times  
 a day.

## 151.

℞  
 Acidi hydrobromici, ʒ x  
 Phenacetini, gr. xl  
 Quininæ sulph., gr. xx  
 Hydrargyri chlor. mit., gr. v  
 Codeinæ sulph., gr. ij  
 Ext. nucis vomicæ, gr. ij  
 Misce et divide in partes  
 æquales decem ingerendas in  
 capsulas gelatinosas.  
 Sig. Horum capsularum una  
 sumatur omni trihorio.

## 152.

℞  
 Acidi hydrocyanici dil., ʒ xxx  
 Sodii bicarbonatis, ̄ iv  
 Syrupi, q. s. ad ̄ ij  
 M. S. Teaspoonful three times  
 a day.

## 153.

℞  
 Acetanilid,  
 Salol, aa. 3 j  
 Monobromated camphor, 3 ss  
 Mix and make 40 pills.

## 154.

℞  
 Liquoris zinci chloridi, f. 3 j  
 Hydrargyri chlor. cor., gr. iv  
 Liquoris calcis, f. ̄ ij  
 Aquæ, q. s. ad f. ̄ iv  
 Misce. Signa: Apply as di-  
 rected.

## 155.

℞  
 Piperazin,  
 Phenocoll hydrochlor., aa. ̄ j  
 Syrup simple,  
 Elixir aromatic, aa. f. 3 j  
 Peppermint water, f. ̄ j  
 Water, enough to make f. ̄ ij  
 Misce et fiat sol.

## 156.

℞  
 Tinct. ferri chloridi, 3 Cc.  
 Tinct. guaiaci ammon., 30 Cc.  
 Tinct. aloes, 15 Cc.  
 Syrupi, q. s. ad 120 Cc.  
 M.

## 157.

℞  
 Morph. sulph. !!!, gr. viij  
 Ext. hyoscyami, gr. v  
 Ext. cannabis indicæ, gr. v  
 Misce. Dispensa in capsulas  
 decem.  
 Signa: Cursu noctis una su-  
 matur.

## 158.

℞  
 Ferri sulphatis, gr. xxx  
 Acidi tannici, gr. x  
 Syrupi, f. ̄ij  
 Aquæ, f. ̄ij  
 M. S. Teaspoonful every two  
 hours.

## 159.

℞  
 Chloral hydrate, gr. xl  
 Camphor, gr. x  
 Syrup of ginger, f. ̄ij  
 Water, f. ̄ij  
 Mix and mark: Teaspoonful  
 three times a day.

## 160.

℞  
 Ferri et quin. cit., 3 j  
 Ac. phosphor. dil., f. 3 j  
 Tinct. cardamomi co., f. 3 ij  
 Syr. limonis, f. 3 ij  
 Aquæ, q. s. ad f. ̄ij  
 M. S. Teaspoonful twice a  
 day.

## 161.

℞  
 Potassii cyanidi, gr. iss  
 Hydrarg. chlor. mitis, gr. xxiv  
 Tragacanthæ,  
 Aquæ, aa. quantum requiritur  
 ut fiat massa in pilulas trigin-  
 ta formanda.  
 Signa: Capiat pilulas duas  
 omni nocte.

## 162.

℞  
 Potassii bromidi, 3 vj  
 Aquæ camphoræ, f. ̄vj  
 M. S. Dessertspoonful before  
 retiring at night.

## 163.

℞  
 Rochelle salt, 3 iv  
 Elixir of vitriol, f. 3 ij  
 Camphor water,  
 enough to make f. ̄ij  
 Mix and label: One ounce, to  
 be repeated if necessary.

## 164.

℞  
 Ext. gelsemii fl., ℥ xij  
 Antipyrini, 3 ij  
 Ammonii iodidi, gr. xx  
 Liq. pot. arsenitis, f. 3 j  
 Elixiris, q. s. ad f. ̄ij  
 M. S. Teaspoonful every two  
 or three hours.

## 165.

℞  
 Tinct. digitalis, f. 3 ij  
 Sp. ammon. arom., f. 3 ij  
 Strychninæ sulph., gr. ss  
 Elix. calisayæ, ad f. ̄vj  
 Misce et signa: Cochleare  
 parvum ter in die.

## 166.

℞ Extracti cannab. ind. fl., f. 3 j  
 Copaibæ, f. 3 iv  
 Tinct. guaiaci,  
 Ol. terebinthinæ, aa. f. 3 ij  
 Tinct. camphoræ, f. 3 iss  
 Syr. zingiberis, q. s. ad f. 3 iv  
 Misce. Fiat mistura.

## 167.

℞ Acidi carbolici, 3 j  
 Collodii, 3 vij  
 M. Ft. sol.  
 Sig. Apply with camel-hair brush.

## 168.

℞ Fowler's solution, f. 3 ij  
 Infusion of cinchona, f. 3 vss  
 Tinct. of nux vomica, f. 3 ij  
 Mix.

## 169.

℞ Liq. plumbi subacet., f. 3 ss  
 Muc. acaciæ, f. 3 j  
 Aq. destil., q. s. ad f. 3 iv  
 M. Ft. lotio.

## 170.

℞ Silver nitrate, 1.5 Gm.  
 Sodium chloride, 0.6 Gm.  
 Water, 200 Cc.  
 Mix. Label: Use as an eye-wash.

## 171.

℞ Lithii salicylatis, 3 ij  
 Ferri et ammon. cit., 3 iv  
 Syr. limonis,  
 Aquæ, aa. f. 3 iv  
 M.

## 172.

℞ Calcii hypophosphitis, gr. xv  
 Hydrarg. chlor. cor., gr. ss  
 Syr. sarsaparil. co., f. 3 ij  
 M. S. Teaspoonful two or three times a day.

## 173.

℞ Hydrarg. chlor. mit., gr. x  
 Santonini, gr. xij  
 M. et fiant capsulæ No. 2.  
 S. To be taken three hours apart.

## 174.

℞ Carbolic acid cryst., gr. c  
 Gum arabic, 3 ss  
 Benzoin,  
 Balsam of tolu, aa. gr. x  
 Essence of cinnamon, ℥ v  
 Saccharin, gr. v  
 Alcohol, a suf. quant. to make f. 3 ij  
 Mix and make a solution.

## 175.

℞ Solution of strychnine,  
 Br. P., f. 3 iss  
 Potassium iodide, gr. xc  
 Water, enough to make f. 3 ij  
 Mix. Label: Teaspoonful after meals.

## 176.

℞ Cocainæ hydrochlor., gr. v  
 Sodæ boratis, gr. ij  
 Aquæ dest., 3 j  
 M. S. Drop one drop in right eye at night.

## 177.

℞ Liq. hydrarg. chlor., 3 j  
 Sp. ammon. arom., 3 vij  
 M. Ft. sol.

## 178.

℞  
 Quininæ sulph., 1.3 Gm.  
 Sodii salicylatis, 15.5 Gm.  
 Acidi hydrobromici dil., 30.0 Cc.  
 Aquæ, q. s. ad 250.0 Cc.  
 M. S. Teaspoonful every four hours.

## 179.

℞  
 Ferri et quinin. cit., 2 Gm.  
 Potassii iodidi, 5 Gm.  
 Syrupi,  
 Aquæ, aa. 30 Cc.  
 M.

## 180.

℞  
 Strychninæ sulph., gr. ss  
 Potassii bromidi, 3 ij  
 Aquæ, q. s. ad f. 3 iv  
 Misce et signa: Teaspoonful three times a day.

## 181.

℞  
 Calcii hypophosphitis,  
 Sodii hypophosphitis, aa. 3 ij  
 Liq. potassii arsenitis, f. 3 j  
 Tinct. ferri chlor., f. 3 j  
 Ac. phosphorici dil., f. 3 j  
 Strychninæ sulph., gr. j  
 Aquæ, q. s. ad f. 3 iv  
 M. S. Teaspoonful three times a day.

## 182.

℞  
 Hydrarg. chlor. mitis, gr. xx  
 Syr. zingiberis, f. 3 j  
 Ac. hydrochlorici, f. 3 j  
 Elixiris, f. 3 j  
 M. S. Dessertspoonful before going to bed.

## 183.

℞  
 Terpin hydrate, 3 ij  
 Iodol, gr. v  
 Ammon. carbon., gr. xl  
 Glycerin, 3 iss  
 Syrup tolu,  
 enough to make f. 3 iv  
 Mix. Label: Tablespoonful every two hours.

## 184.

℞  
 Potassii chloratis, gr. xx  
 Catechu, gr. xxx  
 M. et fiant pulv. No. vi.

## 185.

℞  
 Menthol, 3 ss.  
 Boric acid, 3 j  
 Tinct. of hydrastis, f. 3 ij  
 Water, enough to make f. 3 iv  
 Mix. Mark: Use as spray.

## 186.

℞  
 Fl. ext. of pinkroot,  
 Fl. ext. of senna, aa. f. 3 j  
 Turpentine, f. 3 j  
 Santonin, gr. xv  
 Fl. ext. of dandelion, f. 3 vij  
 Syrup, f. 3 j  
 Mix. Label: Teaspoonful morning, noon, and night.  
 Shake well before using.

## 187.

℞  
 Massæ ferri carbon.,  
 Potassii carbonatis, aa. 3 ss  
 Acidi arsenosi, gr. ss  
 M. Ft. pil. No. xx.  
 Sig. One after each meal.



## 188.

R  
Zinci sulphatis,  
Cupri sulphatis, aa. 3 j  
Morphinæ sulph., 3 ss  
Aquæ rosæ, q. s. ad 3 j  
M. S. One or two drops in  
the eyes twice a day.

## 189.

R  
Cocaine hydrochloride, gr. j  
Silver nitrate, gr. j  
Distilled water, to make f. 3 j  
Mix and label: Put one drop  
in each eye at night.

## 190.

R  
Acidi boricæ, 3 j  
Sodii boratis, 3 ij  
Mucil. acaciæ, f. 3 ij  
Aq. menth. piper., q. s. ad f. 3 iv  
Misce. Sig.: Teaspoonful two  
hours after meals.

## 191.

R  
Aquæ hydrogenii diox., 3 j  
Potassii permangan., gr. xx  
Aquæ, 3 j  
Misceatur conquassando.  
Signetur: Pars affecta fricetur  
nocte manequæ.

## 192.

R  
Hydrargyri chlor. mit., gr. viij  
Acaciæ, 3 ij  
Aquæ lauro-cerasi, f. 3 ij  
M. S. Shake well. Teaspoon-  
ful at 8 and 10 o'clock P.M.

## 193.

R  
Thymol, gr. x  
Alcohol, f. 3 ss  
Ammonia, f. 3 ij  
Sol. of chlorinated soda, f. 3 iss  
Mix. Label: Use as spray.

## 194.

R  
Argentio nitrate, gr. x  
Cocaine, gr. xij  
Water, enough to make 3 j  
Mix and label: Lotion.

## 195.

R  
Tinct. ferri chloridi, f. 3 ij  
Quininæ sulph., gr. xvij  
Spiritus chloroformi, f. 3 j  
Aquæ pimentæ, q. s. ad f. 3 iv  
M.

## 196.

R  
Quininæ sulph., 3 ij  
Potassii citratis, 3 ij  
Acidi citrici, 3 j  
Aquæ, q. s. ad f. 3 vj  
M. S. Cochleare medium post  
cibum.

## 197.

R  
Pilocarpinæ hydrochlor., gr. 1/8  
Hydrarg. chlor. mitis, gr. 1/4  
Misce. Da tales numero octo  
Signa: Horum pulverum su-  
matur unus nocte manequæ.

## 198.

R  
Acidi sulphurici conc., 3 ss.  
Picis liquidæ, 3 iv  
Potassii bichromatis, 3 ij  
Misce caute.  
Signa: Caustic for horse.

## 199.

R  
Ung. hydrarg. nitratis,  
Linimenti calcis, aa. 3 j  
Fiat unguentum, more dicto  
utendum.

## 200.

℞  
 Ext. gelsemii fl., f. 3 iss  
 Ext. cannabis ind. fl., gtt. xviii  
 Chloralis, 3 iss  
 Antipyrini, 3 j  
 Aquæ puræ, f. 3 j  
 M. S. One teaspoonful every  
 four hours.

## 201.

℞  
 Liquoris ammonii acet., 30 Cc.  
 Tinct. ferri chloridi, 15 Cc.  
 Syrupi, q. s. ad 60 Cc.  
 Misce.

## 202.

℞  
 Strychninæ nitratis, gr. ij  
 Liq. potassii arsenitis, f. 3 ij  
 Aquæ, q. s. ad f. 3 ij  
 M. S. Dram doses.

## 203.

℞  
 Potassii cyanidi, 3 ss  
 Chloralis, 3 ij  
 Cerati, 3 j  
 Misce et signa : Unguentum.

## 204.

℞  
 Quininæ sulph., 2.0 Gm.  
 Tinct. cantharidis, 3.5 Cc.  
 Spiritus rosemarini, 15.0 Cc.  
 Infusi salviæ, 120.0 Cc.  
 M. S. Apply to the scalp.

## 205.

℞  
 Zinci oxidi, 3 ij  
 Zinci carbonatis, 3 j  
 Petrolati, ss  
 Liquoris calcis, q. s. ad 3 iv  
 Misce. Signa : Apply with  
 friction.

## 206.

℞  
 Acidi salicylici, 3 j  
 Glycerini, 3 ij  
 Aquæ dest., 3 ij  
 Misce et fiat sol.  
 Signa : Teaspoonful every  
 hour.

## 207.

℞  
 Hydrargyri chlor. mitis, gr. xxx  
 Tinct. iodi B. P., 3 ij  
 Aquæ q. s. ad 3 ij  
 M. S. To be painted on  
 swelling on neck.

## 208.

℞  
 Cocain. hydrochlor.,  
 Morph. sulphatis, aa. gr. xv  
 Chloralis hydratis,  
 Camphoræ, aa. 3 ij  
 Tinct. cannabis ind.,  
 Chloroformi,  
 Ætheris, aa. f. 3 ij  
 M. S. Ten drops in a tea-  
 spoonful of water every two  
 hours until relieved.

## 209.

℞  
 Tinct. ferri chloridi, 3 ij  
 Aquæ ammoniæ,  
 q. s. to neutralize the acid  
 Syrupi, f. 3 ij  
 Misce. Signa : Dessertspoon-  
 ful three times a day.

## 210.

℞  
 Sodii salicylatis, gr. xxx  
 Spiritus ætheris nitrosi, ʒ xxx  
 Aquæ, f. 3 ij  
 Misce. Signa : Cochleare me-  
 dium ter quotidie.

## 211.

℞  
 Tinct. ferri chloridi, f.  $\frac{3}{4}$  ss  
 Acidi sulphurosi, f.  $\frac{3}{4}$  ij  
 Potassii chloratis,  $\frac{3}{4}$  ij  
 Glycerini, f.  $\frac{3}{4}$  j  
 Aquæ, q. s. ad f.  $\frac{3}{4}$  vj  
 Misce. Signa: Use with atomizer.

## 212.

℞  
 Potassii nitratis,  
 Sodii chloridi,  
 Camphoræ, aa. 3 Gm.  
 Tincturæ opii,  
 Aquæ, aa. 15 Cc.  
 Alcoholis, q. s. ad 120 Cc.  
 M. S. Apply with friction.

## 213.

℞  
 Hydrargyri chlor. cor., gr. xx  
 Sodii boratis,  $\frac{3}{4}$  ij  
 Aquæ destil.,  $\frac{3}{4}$  iv  
 Fiat lotio. Sæpe utenda.

## 214.

℞  
 Liq. potassii arsenitis,  
 Syrupi ferri iodidi, aa.  $\frac{3}{4}$  ij  
 Syrupi tolutani,  $\frac{3}{4}$  iss  
 M. S. Teaspoonful three times a day

## 215.

℞  
 Piperazini,  $\frac{3}{4}$  j  
 Teratur bene. Fiant pulveres duodecim.

## 216.

℞  
 Cocaine hydrochloride, gr. v  
 Gallic acid, gr. x  
 Oxide of zinc ointment,  $\frac{3}{4}$  iv  
 Vaseline, to make  $\frac{3}{4}$  j  
 Mix. Label: Apply locally.

## 217.

℞  
 Acidi carbolici cryst., gr. x  
 Plumbi acetatis, gr. x  
 Thymol, gr. xv  
 Morphinæ sulph., gr. ij  
 Olei theobromatis,  $\frac{3}{4}$  iij  
 Misce accuratissime. Fiant suppositoria numero decem.

## 218.

℞  
 Quinine sulphate, gr. xv  
 Sodium benzoate, gr. x  
 Aromat. sulphuric acid,  $\mathfrak{M}$  x  
 Elixir, enough to make f.  $\frac{3}{4}$  j  
 Mix. Label: One half teaspoonful three times a day.

## 219.

℞  
 Mercuric chloride, gr. ij  
 Tinct. chloride of iron, f.  $\frac{3}{4}$  j  
 Quinine sulphate,  $\frac{3}{4}$  j  
 Dilute hydrobromic acid, f.  $\frac{3}{4}$  j  
 Water, to make f.  $\frac{3}{4}$  vj  
 Mix. Label: Teaspoonful three times a day.

## 220.

℞  
 Raw linseed-oil, f.  $\frac{3}{4}$  viij  
 Potassium nitrate,  
 Lead acetate,  
 Sulphuric acid, aa.  $\frac{3}{4}$  ss  
 Carbolic acid,  $\frac{3}{4}$  ij  
 Mix and label: Caustic.

## 221.

℞  
 Potassii acetatis, 3 viss  
 Sodii bicarbonatis,  $\frac{3}{4}$  ij  
 Morphinæ sulphatis, gr. ij  
 Tinct. ferri chlor., f.  $\frac{3}{4}$  j  
 Quininæ sulphatis, gr. x  
 Aquæ dest., q. s. ad f.  $\frac{3}{4}$  vj  
 M. S. Teaspoonful three times a day.

## 222.

℞ Strychnine, gr. j  
Caffeine, gr. iij  
Arsenous acid, gr. j  
Iodoform, gr. viij  
Syrup of hydriodic acid, f. ̄ ij  
Syrup of hypophosphites, f. ̄ vj  
Mix. Label: Teaspoonful  
four times a day.

## 223.

℞ Iodoform, ̄ ij  
Balsam of Peru, ̄ iij  
Glycerin, ̄ xiv  
Mix and mark: Apply as directed.

## 224.

℞ Carbolic acid,  
Vaselin,  
Bay rum, aa. ̄ j  
Mix and use externally.

## 225.

℞ Tinct. ferri chlor., f. ̄ ij  
Sodii salicylatis, ̄ iv  
Liq. ammon. acet., f. ̄ j  
Ol. gaultheriæ, gtt. x  
Glycerini, f. ̄ ss  
Aquæ, q. s. ad f. ̄ iv  
M.

## 226.

℞ Exalgin, gr. x  
Phenacetin, gr. xv  
Camphor, gr. v  
Salol, gr. xv  
Mix and make 10 powders.

## 227.

℞ Hydrarg. perchloridi, gr. ij  
Potassii iodidi, ̄ ij  
Sp. chloroformi,  
Tinct. cinchonæ, aa. f. ̄ j  
Quininæ sulph., ̄ ss  
Aquæ, ̄ ij  
M.

## 228.

℞ Sp. ammoniæ arom., f. ̄ ij  
Liquoris calcis, f. ̄ iiss  
M. S. Dessertspoonful as  
needed.

## 229.

℞ Bismuthi subnitratis, ̄ ij  
Spiritus ammoniæ arom., f. ̄ ij  
Tinct. opii, gtt. xx  
Zinci acetatis, ̄ j  
Syrupi, q. s. ad f. ̄ ij  
M. S. Teaspoonful every  
three hours until relieved.

## 230.

℞ Ergotin, gr. x  
Tinct. of cinnamon, ̄ j  
Mix and label: Take as directed.

## 231.

℞ Plumbi acetatis,  
Ammonii carbonatis, aa. ̄ j  
Aquæ rosæ, f. ̄ viij  
Fiat lotio. Signa: Apply on  
lint to allay irritation.

## 232.

℞ Ergotinæ, gr. xx  
Apioli, ̄ iss  
Olei sabinæ, ̄ ss  
Mix and make 18 pills.

## 233.

℞  
Sodii salicylatis, 3 ij  
Quininae sulph., gr. xxiv  
Hydrargyri chlor. cor., gr.  $\frac{3}{4}$   
Liq. potassii arsenitis, ℥ xlvij  
Elixiris aromatici, q. s. ad f. 3 iij  
M.

## 234.

℞  
Fl. ext. hydrastis colorless, f. 3 j  
Sodium bicarbonate,  
Bismuth subnitrate, aa. 3 ss  
Borax, 3 ij  
Honey, 3 ss  
Peppermint water,  
enough to make 3 vj  
Mix. Label: Shake well.  
Teaspoonful before meals.

## 235.

℞  
Iodine, gr. xxx  
Compound camphor lin., f. 3 iij  
Soap liniment,  
enough to make f. 3 ij  
Mix. Label: Apply as directed.

## 236.

℞  
Acidi carbolici, 3 iij  
Aquæ ammoniæ,  
Liq. sod. chloratæ, aa. 3 ij  
Aquæ, q. s. ad f. 3 viij  
M. S. Lotion.

## 237.

℞  
Ext. henbane, gr. xvj  
Ext. cannabis ind. gr. xvj  
Chloral hydrate, 3 ivss  
Potassium bromide, 3 ivss  
Alcohol, 3 j  
Water, to make 3 xvi  
Mix. Label: Teaspoonful at night.

## 238.

℞  
Calomel, gr. x  
Sodium bicarb., gr. xx  
Sugar, powd., gr. xl  
Mix and make 40 powders.

## 239.

℞  
Sodii bicarbonatis, 3 ij  
Sodii salicylatis, 3 iv  
Chloroformi, 3 ss  
Acidi carbolici, ℥ x  
Aquæ fontanæ, q. s. ad 3 iv  
M. S. Teaspoonful one hour  
after meals.

## 240.

℞  
Antipyrin,  
Acetanilid, aa. 2 Gm.  
Resorcin, 3 Gm.  
Water, 100 Cc.  
Mix. Label: Teaspoonful  
every hour until the fever begins  
to subside.

## 241.

℞  
Cocaine hydrochlor., 0.8 Gm.  
Flexible collodion, 10.0 Gm.  
Mix. Apply with camel-hair  
brush.

## 242.

℞  
Atropine sulphate, gr. ij  
Olive oil, 3 ij  
Mix. Label: Apply with fric-  
tion.

## 243.

℞  
Chromic acid, gr. iv  
Cocaine hydrochlorate, gr. vj  
Water, 3 ij  
Mix. Use as caustic.

## 244.

℞  
Sp. ætheris nitrosi,  
Tincturæ guaiaci, aa. f. 3 j  
Tincturæ colchici, f. 3 iv  
Syrupi, f. 3 iij  
M.

## 245.

R Zinci sulphatis,  
Pot. sulphuratæ, aa. gr. xxx  
Aquæ rosæ,  $\bar{\text{v}}$  j  
Mix. Label: Lotion.

## 246.

R Strychnine sulph., gr. j  
Arsenous acid, gr.  $\frac{2}{3}$   
Mass carb. of iron, gr. l  
Sulphuric acid aromat., gtt. iij  
Quinine sulphate, gr. xx  
Mix and divide into 20 pills.

## 247.

R Silver nitrate, gr. x  
Potassium permanganate, gr. xv  
Distilled water,  $\bar{\text{v}}$  ij  
Mix. Use as wash.

## 248.

R Guaiacol carbonate, gr. iij  
Thymol, gr. j  
Menthol, gr. ss  
Eucalyptol,  $\text{m}$  v  
For one capsule. Send 20  
such.

## 249.

R Benzoic acid,  
Salicylic acid, aa. gr. iij  
Cocaine hydrochlorate, gr. v  
Distilled water,  $\bar{\text{v}}$  j  
Mix and make solution by aid  
of water-bath.  
Label: Apply locally.

## 250.

R Antikamnia,  $\bar{\text{v}}$  j  
Strychnine sulph., gr. j  
Iron sulphate, dried, gr. iij  
Quinine sulphate,  $\bar{\text{v}}$  j  
Mix and put into 9 capsules.  
Label: One every night and  
morning.

## 251.

R Oil of cinnamon, gtt. x  
Chloroform,  
Tincture of opium,  
Spirit of camphor,  
Aromat. spirit of ammonia,  
aa. f.  $\bar{\text{v}}$  v  
Whiskey,  $\bar{\text{v}}$  iss  
Mix. Dose: One dram as  
needed.

## 252.

R Argenti nitratis, gr. vj  
Liquoris Fowleri, f.  $\bar{\text{v}}$  j  
Aquæ, q. s. ad f.  $\bar{\text{v}}$  iv  
M. S. Teaspoonful twice a  
day.

## 253.

R Hydrarg. iodidi viridis, gr.  $\frac{3}{4}$   
Potassii chloratis, gr. iij  
Potassii iodidi, gr.  $\frac{3}{4}$   
Chocolate, a sufficient amount.  
Mix. Make one tablet. Send  
20.

## 254.

R Olei ricini,  
Glycerini, aa. 20 Cc.  
M. S. Tablespoonful at night.

## 255.

R Volatile liniment,  $\bar{\text{v}}$  iss  
Tincture aconite,  $\bar{\text{v}}$  ij  
Tincture iodine,  $\bar{\text{v}}$  ij  
Mix. Apply as directed.

## 256.

R Unguenti hydrargyri,  $\bar{\text{v}}$  v  
Tincturæ iodi, f.  $\bar{\text{v}}$  iij  
Mix well and make an oint-  
ment. Label: Apply as directed.

## 257.

℞ Syr. ferri iodidi, f.  $\bar{5}$  j  
 Antipyrini,  $\bar{5}$  ij  
 Syrupi, f.  $\bar{5}$  j  
 M. S. Teaspoonful as directed.

## 258.

℞ Acidi carbolici, 3 j  
 Potassii permanganatis, gr. xx  
 Aquæ, f.  $\bar{5}$  v  
 M. S. Lotion.

## 259.

℞ Plumbi acetatis,  
 Boracis, aa. 1 Gm.  
 Glycerini, 20 Cc.  
 Aquæ, 80 Cc.  
 M. S. Apply as directed.

## 260.

℞ Acidi tannici, gr. xv  
 Tincturæ iodi, f. 3 j  
 Glycerini, f. 3 ij  
 Aquæ, f. 3 v  
 M. S. Apply twice a day.

## 261.

℞ Potassii chloratis, 3 j  
 Acidi sulphurosi, 3 iv  
 Glycerini, 3 iij  
 Aquæ,  $\bar{5}$  j  
 M. S. Mix one teaspoonful with a glass of water and use as a gargle.

## 262.

℞ Acidi chromici, 5 Gm.  
 Glycerini,  
 Alcoholis, aa. 5 Cc.  
 M. S. Caustic.

## 263.

℞ Ammoniated mercury, 3 ss  
 Tincture of iodine, 3 ss  
 Lard,  $\bar{5}$  j  
 Mix and make an ointment.

## 264.

℞ Salol, gr. xxx  
 Tincture chlor. of iron, f. 3 ij  
 Syrup, enough to make f.  $\bar{5}$  ij  
 M. S. Teaspoonful three times a day.

## 265.

℞ Tinct. of iodine, f. 3 ij  
 Collodion, f. 3 iij  
 Ammonia water, f. 3 j  
 Mix. Apply with camel-hair brush.

## 266.

℞ Liq. iodi comp., f. 3 ij  
 Liq. potassæ, f. 3 iv  
 Olei olivæ, f.  $\bar{5}$  j  
 M. S. Apply as directed.

## 267.

℞ Tinct. chloride of iron, f. 3 j  
 Sol. of arsenous acid, f. 3 ss  
 Quinine sulphate, gr. x  
 Cinnamon water, f. 3 ij  
 Mix. Label: Teaspoonful three times a day.

## 268.

℞ Pyrogallic acid, gr. v  
 Mercuric chloride, gr. ss  
 Lard,  $\bar{5}$  j  
 Mix and make an ointment.

## 269.

℞ Exalgin, gr. iv  
 Beta-naphthol, gr. xij  
 Lard, 3 iv  
 Mix.

## 270.

℞  
 Olei tigllii, gtt. ij  
 Glycerini, f. 3 j  
 M. S. Take in two doses four hours apart.

## 271.

℞  
 Plumbi acetatis, gr. x  
 Acidi pyrogallici, gr. v  
 Aquæ, 3 ij  
 M. S. Lotion.

## 272.

℞  
 Olei morrhuæ, f. 3 iv  
 Acaciæ, 3 j  
 Syrupi tolutani, f. 3 iv  
 Sodii boratis, gr. xv  
 Aquæ, q. s. ad f. 3 ij  
 M. S. Teaspoonful three times a day

## 273.

℞  
 Strychninæ sulph.,  
 Potassii cyanidi, aa. gr. ss  
 Aquæ, q. s. ad f. 3 ij  
 M. S. Teaspoonful night and morning.

## 274.

℞  
 Glycerini, 3 ii j  
 Sodii boratis, 3 ss  
 Unguenti, 3 ii j  
 M. S. Apply at night.

## 275.

℞  
 Mercuric chloride, gr. j  
 Tartar emetic, gr. v  
 Syrup of squills, f. 3 ij  
 Mix and label: Half teaspoonful as directed.

## 276.

℞  
 Morphine hydrochlor., gr. iss  
 Codeine, gr. ii j  
 Ammonium chloride, gr. xx  
 Water, enough to make f. 3 ij  
 Mix and label: Teaspoonful every two hours for cough.

## 277.

℞  
 Calcis calcinata, 3 ij  
 Sulphuris, 3 ii j  
 Aquæ, f. 3 iv  
 Mix and boil for ten minutes and then filter.  
 Label: Use as directed.

## 278.

℞  
 Zinci oxidi, 3 ij  
 Glycerini, f. 3 ij  
 Liq. plumbi subacetatis, f. 3 j  
 Liquoris calcis, q. s. ad f. 3 iv  
 M. S. Lotion.

## 279.

℞  
 Calcis chloratæ,  
 Glycerini, aa. 10 Gm.  
 M. S. Apply as directed.

## 280.

℞  
 Acetate of potassium, 3 j  
 Divide into 6 powders.  
 Label: Take one every two hours.

## 281.

℞  
 Acidi salicylici, gr. x  
 Potassii permangan., gr. xv  
 Ferri sulphatis, 3 iv  
 Aquæ, q. s. ad f. 3 vii j  
 M. S. Lotion for ulcer.



## 282.

℞ Quininæ sulphatis, 3 ss  
 Tinct. ferri chlor., f. 3 ij  
 Syrupi zingiberis, f. 3 ij  
 Tinct. guaiaci ammon., f. 3 j  
 M. S. Teaspoonful twice a day.

## 283.

℞ Quininæ sulph.,  
 Potassii permangan.,  
 Ferri reducti, aa. gr. x  
 Misce. Fiant pilulæ No. x.  
 Sig. Pil. j ter in die.

## 284.

℞ Strychninæ, gr. j  
 Glycerini, ℥ xxx  
 Aquæ, q. s. ad f. 3 iij  
 M. S. Inject ten minims.

## 285.

℞ Acidi carbolici cryst., gr. xxx  
 Thymol, gr. x  
 Vaselini,  
 Cerati, aa. 3 j  
 M. S. Unguentum.

## 286.

℞ Sodii phosphatis, 3 ij  
 Sodii chloridi, 3 iv  
 Lithii bromidi, 3 iij  
 Aquæ, q. s. f. 3 viij  
 M. Ft. Sol.  
 Sig. Take dessertspoonful three times a day.

## 287.

℞ Quinine sulph., gr. l  
 Podophyllin, gr. iv  
 Tinct. chlor. of iron, f. 3 iiss  
 Tinct. of rhubarb, f. 3 iss  
 Mix.

## 288.

℞ Powdered camphor, gr. lxx  
 Lead acetate, gr. l  
 Tinct. of iodine, ℥ l  
 Carbolic acid, gr. xx  
 Mix and make 24 pills.

## 289.

℞ Quininæ sulphatis, gr. xx  
 Potassii iodidi, 3 ij  
 Acidi citrici, gr. xx  
 Aquæ, f. 3 ij  
 M. S. Teaspoonful three times a day.

## 290.

℞ Phenacetin, gr. xv  
 Tincture ferric chloride, f. 3 ij  
 Water, enough to make f. 3 ij  
 Mix and label: Teaspoonful twice a day.

## 291.

℞ Sodium salicylate,  
 Sodium benzoate, aa. 3 j  
 Tannic acid, gr. x  
 Carbolic acid, gtt. xij  
 Lime water, f. 3 iv  
 Mix. Label: Teaspoonful half hour after meals.

## 292.

℞ Bichloride of mercury, gr. x  
 Spirit of nitrous ether,  
 Dilute alcohol, of each f. 3 j  
 Mix. Label: Apply externally.

## 293.

℞ Potassii chloratis, 3 i  
 Aquæ bullient., f. 3 i  
 Liq. morph. hydrochlor., B. P., f. 3 j  
 Syrupi tolutani, f. 3 ij  
 M. S. Teaspoonful when coughing.

## 294.

℞  
 Syrupi acidi hydriodici, f. 3 vj  
 Ext. cinchonæ fl., f. 3 j  
 Liq. hydrarg. chlor. cor.  
 (1-500), f. 3 ij  
 Syrupi, f. 3 vij  
 Misce et signa: Teaspoonful  
 every four hours.

## 295.

℞  
 Tincture chloride of iron, f.  $\frac{5}{3}$  j  
 Dilute phosphoric acid, f.  $\frac{5}{3}$  j  
 Syrup of hypophosphites,  
 f.  $\frac{5}{3}$  viij  
 Mix. Label: Teaspoonful after  
 meals.

## 296.

℞  
 Syr. ferri iodidi, f. 3 iv  
 Syr. hypophosphitum, f.  $\frac{5}{3}$  j  
 Quininæ sulph., 3 j  
 Acidi phosphorici dil., f. 3 iij  
 M.

## 297.

℞  
 Calcii hypophosphitis, 3 j  
 Aquæ, f.  $\frac{5}{3}$  ij  
 Tinct. ferri chlor., f. 3 iv  
 Morph. sulphatis, gr. iv  
 Syrupi tolutani, f.  $\frac{5}{3}$  ij  
 M. S. Teaspoonful three times  
 a day.

## 298.

℞  
 Hydrargyri chlor. cor., gr. iv  
 Sodii arsenatis, gr. iiss  
 Strychninæ sulph., gr.  $\frac{1}{4}$   
 Potassii carbonatis,  
 Ferri sulph. exsic., aa. gr. x  
 Misce et fiant pilulæ No. x.

## 299.

℞  
 Calomel, 3 ij  
 Soap, 3 ij  
 Cotton-seed oil, f.  $\frac{5}{3}$  j  
 Water, f.  $\frac{5}{3}$  j  
 Mix. Label: Apply with fric-  
 tion.

## 300.

℞  
 Liq. sodii arsenatis, 3 ij  
 Potassii iodidi, gr. xl  
 Quininæ sulph., 3 j  
 Acidi sulph. dil., f. 3 j  
 Aquæ, q. s. ad f.  $\frac{5}{3}$  iij  
 M. S. Teaspoonful twice a  
 day.

## 301.

℞  
 Balsami Peruviani, 4 Gm.  
 Ext. glycyrrhizæ, q. s.  
 Misce. Make 10 pills.  
 Signa: One night and morn-  
 ing.

## 302.

℞  
 Acidi hyd. dil., 20 Cc.  
 Aquæ, 100 Cc.  
 M. Sig. Teaspoonful in water  
 after meals.

## 303.

℞  
 Petrolatum, 30 Gm..  
 Oxide of zinc, 4 Gm.  
 Glycerin, 5 Gm.  
 Gum tragacanth, 5 Gm..  
 Mix and make ointment.  
 Label: Apply as directed.

## 304.

℞  
 Potassii iodidi, 2 Gm.  
 Divide into 12 powders.  
 Take one dissolved in water at  
 night.

## 305.

℞ Iodi resublim., gr. xl  
 Adipis, ʒ j  
 M. S. Rub over the affected part.

## 306.

℞ Potass. chloratis, ʒ ij  
 Syr. ferri iodidi, ʒ ss  
 Quininae sulph., ʒ j  
 Ac. sulphurici dil., ℥ xx  
 Aquæ, q. s. ad ʒ ij  
 M. S. Teaspoonful after each meal.

## 307.

℞ Tincture of aconite, ℥ xx  
 Phenacetin, gr. xl  
 Spirit of nitrous ether, ℥ ʒ v  
 Syrup, f. ʒ iiij  
 Water, f. ʒ ij  
 Mix and label: Teaspoonful every two hours until the fever subsides.

## 308.

℞ Bals. copaibæ,  
 Pulv. cubebæ, aa. ʒ j  
 Misce et fiant pilulæ No. xx.  
 Signa: One night and morning.

## 309.

℞ Bismuthi subnit., ʒ j  
 Sodii salicylatis, ʒ j  
 Aquæ cinnamomi, ʒ ij  
 M. S. Shake well! Teaspoonful twice a day.

## 310.

℞ Chloral hydrate, ʒ j  
 Phenacetin, gr. xl  
 Quinine sulphate, gr. l  
 Mix and put into 10 capsules,  
 Label: Take one at night.

## 311.

℞ Aloin, gr. ij  
 Salol, gr. xl  
 Tinct. of hyoscyamus, ʒ iss  
 Ext. of jalap, gr. x  
 Strychnine sulph., gr. ¼  
 Mix and make 20 pills.  
 Label: Take one at night.

## 312.

℞ Salicylic acid, gr. xx  
 Glycerin, f. ʒ j  
 Lime water, f. ʒ v  
 Mix. Label: Tablespoonful twice a day.

## 313.

℞ Acetanilid, ʒ ij  
 Tinct. of ferric chloride, f. ʒ v  
 Water, enough to make f. ʒ iv  
 Make solution with the aid of heat.  
 Label: Teaspoonful three times a day.

## 314.

℞ Potassii bichromatis, gr. x  
 Ferri sulphatis, ʒ iss  
 Aq. hydrogenii dioxidi,  
 Glycerini, aa. f. ʒ j  
 Aquæ dest., q. s. ad f. ʒ iv  
 M. S. Lotion.

## 315

℞ Iodoform, gr. xxx  
 Boric acid, ʒ j  
 Calomel, gr. xx  
 Bismuth subnitrate, ʒ j  
 Mix. Label: Dust on abraded surface as directed.

## 316.

℞ Glyc. boroglycerini,  $\bar{\text{z}}$  j  
 Hydrargyri chlor. cor., gr. ij  
 Aquæ, q. s. ad  $\bar{\text{z}}$  iv  
 M. S. Apply to ulcer.

## 317.

℞ Tinct. iodi comp., f.  $\bar{\text{z}}$  ij  
 Acidi salicylici,  $\bar{\text{z}}$  j  
 Glycerini, f.  $\bar{\text{z}}$  iss  
 Aquæ, enough to make f.  $\bar{\text{z}}$  iv.  
 Mix and label: Paint over the affected part several times a day.

## 318.

℞ Citrate of iron and quin.,  $\bar{\text{z}}$  iiss  
 Carbolic acid,  
 Tinct. of lavender co., aa.  $\bar{\text{z}}$  ss  
 Wine, enough to make  $\bar{\text{z}}$  iv  
 Mix. Label: Teaspoonful three times a day.

## 319.

℞ Diuretin, gr. x  
 Sp. of nitrous ether,  $\text{℥}$  xxx  
 Tinct. chlor. of iron,  $\bar{\text{z}}$  iv  
 Syrup, enough to make f.  $\bar{\text{z}}$  ij  
 Mix. Label: Teaspoonful three times a day.

## 320.

℞ Quininae sulph., gr. x  
 Antipyrin, gr. x  
 Chloral hydrate, gr. xx  
 Mix and put into 8 capsules.  
 Label: One every two hours.

## 321.

℞ Pilocarpine, gr. j  
 Terpin hydrate,  $\bar{\text{z}}$  j  
 Glycerin, f.  $\bar{\text{z}}$  ij  
 Syrup of tolu, f.  $\bar{\text{z}}$  iss  
 Water, f.  $\bar{\text{z}}$  iss  
 Mix and make a solution.  
 Teaspoonful five times a day.

## 322.

℞ Syr. ferri iodidi, f.  $\bar{\text{z}}$  iss  
 Potass. iodidi,  $\bar{\text{z}}$  j  
 Potass. bicarbon.,  $\bar{\text{z}}$  j  
 Syr. tolutani, f.  $\bar{\text{z}}$  ss  
 Aquæ, f.  $\bar{\text{z}}$  ij  
 M. S. Teaspoonful three times a day.

## 323.

℞ Acetanilid, gr. v  
 Phenacetin, gr. x  
 Pyrocatechin, gr. x  
 Mix and put into 10 capsules.  
 Label: One every four hours.

## 324.

℞ Quininae sulph.,  $\bar{\text{z}}$  j  
 Ferri phosphatis sol.,  $\bar{\text{z}}$  ij  
 Strychninae sulph., gr. j  
 Acidi phosphorici dil., f.  $\bar{\text{z}}$  ss  
 Syrupi zingiberis, f.  $\bar{\text{z}}$  ij  
 Aquæ, q. s. ad f.  $\bar{\text{z}}$  iv  
 M. S. Teaspoonful three times a day.

## 325.

℞ Ferri et potass. tartratis,  $\bar{\text{z}}$  ss  
 Potassii iodidi,  $\bar{\text{z}}$  ss  
 Quininae sulphatis, gr. xv  
 Acidi sulphurici dil.,  $\text{℥}$  xx  
 Syrupi, f.  $\bar{\text{z}}$  ss  
 Aquæ, q. s. ad f.  $\bar{\text{z}}$  ij  
 M. S. Teaspoonful twice a day.

## 326.

℞  
 Quinine sulphate, ʒ j  
 Strychnine sulphate, gr. j  
 Phosphoric acid dil., f. ʒ iv  
 Tinct. chloride of iron, f. ʒ v  
 Aromatic elixir, to make f. ʒ iv  
 Mix. Label: Take a teaspoonful after meals.

## 327.

℞  
 Hydrargyri, gr.  $\frac{1}{8}$   
 Iodi, gr.  $\frac{1}{32}$   
 Acidi tannici, gr.  $\frac{1}{8}$   
 Glycerini, ℥ xv  
 M. S. One half by hypodermic injection.

## 328.

℞  
 Tincturæ iodi, f. ʒ iij  
 Liquoris potass. arsenitis, f ʒ ij  
 M. S. Take five minims in water after meals.

## 329.

℞  
 Calomel, gr. ij  
 Pepsin, gr. xx  
 Sodium bromide, gr. xl  
 Mix and make four powders.  
 Label: Take one every hour.

## 330.

℞  
 Sol. strych. hydrochlor., f. ʒ iij  
 Sol. of saccharin, to make f. ʒ ij  
 Mix. Label: Twenty drops three times a day.

## 331.

℞  
 Boroglycerin, 50%, ʒ iv  
 Vaseline, ʒ iv  
 Mix. Label: Apply freely.

## 332.

℞  
 Infusi humuli, f. ʒ vj  
 Tincturæ iodi, f. ʒ j  
 Glycerini, f. ʒ j  
 Mix. Use as directed.

## 333.

℞  
 Tinct. myrrh, f. ʒ iv  
 Tinct. chloride of iron, f. ʒ j  
 Glycerin, f. ʒ iij  
 Sat. sol. potass. chlorate, f. ʒ ij  
 Mix. Label: Use as gargle.

## 334.

℞  
 Fl. ext. nux vomica, ℥ xl  
 Fl. ext. digitalis, ʒ iss  
 Tinct. strophanthus, ʒ ss  
 Potassium nitrite, ʒ viiss  
 El. gen. and iron, to make ʒ vj  
 Mix. Label: Teaspoonful three times a day.

## 335.

℞  
 Oil of cubebs, f. ʒ iij  
 Oil of sandalwood, f. ʒ iv  
 Balsam of copaiba, f. ʒ j  
 Sp. of nit. ether, to make ʒ iv  
 Mix. Label: Teaspoonful three times a day.

## 336.

℞  
 Potassii chloratis, ʒ j  
 Tincturæ ferri chloridi, f. ʒ j  
 Acidi carbolic, gtt. x  
 Aquæ, q. s. ad f. ʒ v  
 M. S. Use as gargle.

## 337.

℞  
 Oleate of mercury, 2%, ʒ j  
 Iodine, gr. ij  
 M. Label: Use locally.

## 338.

℞  
 Potassii citratis, ʒ ij  
 Potassii chloratis, ʒ iiss  
 Spiritus ætheris nitrosi, f. ʒ j  
 Aquæ camphoræ, f. ʒ vj  
 M. S. Dessertspoonful every two or three hours.

## 339.

℞ Argenti nitratis, ʒ j  
 Glycerini, f. ʒ ij  
 Aquæ dist., f. ʒ j  
 Mix and mark No. 1.  
 Label: Mix three drops with six drops of No. 2 and put into eyes at bedtime.

℞ Potassii iodidi, ʒ ij  
 Glycerini, f. ʒ iv  
 Aquæ dist., f. ʒ ij  
 Mix and mark No. 2.  
 Label: Mix six drops with three drops of No. 1 and put into eyes at bedtime.

## 340.

℞ Morphinae sulph., gr. j  
 Chloroformi, ʒ ss  
 Spir. ammoniæ aromat., ʒ ij  
 Aquæ camphoræ, q. s. ad ʒ j  
 M. S. Teaspoonful when needed for pain.

## 341.

℞ Spts. turpentine, f. ʒ iiss  
 Mercuric chloride, ʒ ss  
 Mix and make solution.  
 Iodine, ʒ ss  
 Alcohol, f. ʒ iiss  
 Dissolve iodine in alcohol and add to above solution.  
 Label: Liniment.

## 342.

℞ Sodium bromide, ʒ iv  
 Antipyrin, ʒ iss  
 Chloral hydrate, ʒ iiss  
 Syrup lemon, f. ʒ j  
 Water, to make f. ʒ iv  
 Mix. Label: Teaspoonful at bedtime.

## 343.

℞ Piperazin, ʒ j  
 Strychnine sulphate, gr. ij  
 Syrup orange, f. ʒ vj  
 Chloroform water, to make f. ʒ vj  
 Mix. Teaspoonful three times a day.

## 344.

℞ Chloral hydrate,  
 Ammonol, of each gr. xxv  
 Mix and make five capsules.  
 Label: One every four hours.

## 345.

℞ Antipyrin, gr. x  
 Quinine sulphate, gr. j  
 Dil. sulphuric acid, q. s.  
 Cinnamon water, to make f. ʒ j  
 Mix. Take in two doses one hour apart.

## 346.

℞ Calomel, gr. j  
 Salol, gr. xx  
 Trional, gr. x  
 Make capsules No. 6.  
 Label: One every hour.

## 347.

℞ Sodium bromide, gr. xl  
 Antipyrin, gr. xxxvj  
 Camphor, gr. iv  
 Caffeine citrate, gr. vj  
 Tinct. aconite, gtt. xij  
 Mix and make twelve capsules.  
 Label: One capsule every three or four hours.

## 348.

℞ Guaiacol, ʒ ij  
 Acacia, ʒ ij  
 Ammon. carbonate, ʒ iij  
 Infusion digitalis, f. ʒ iss  
 Water, to make f. ʒ iij  
 Mix. Label: Teaspoonful four times a day.

## 349.

℞ Gold and sodium chlor., gr. ss  
Strychnine sulphate, gr. j  
Alcohol, f.  $\bar{3}$  j  
Syrup cinnamon, f.  $\bar{3}$  ij  
Water, to make f.  $\bar{3}$  vj  
M. Take one teaspoonful in water after each meal.

## 350.

℞ Potass. acetatis,  $\bar{3}$  ss  
Spiritus ætheris nit., f.  $\bar{3}$  ij  
Aquaë, q. s. ad f.  $\bar{3}$  j  
M. S. Take in two doses one hour apart.

## 351.

℞ Mercury protiodide, gr. xvj  
Potassium iodide,  $\bar{3}$  ij  
Water,  $\bar{3}$  ij  
Mix and make solution.  
Label: One half teaspoonful three times daily.

## 352.

℞ Morphine sulphate, gr. j  
Antikamnia, gr. xx  
Elixir aromatic, f.  $\bar{3}$  j  
Mix and label: Teaspoonful at bedtime.

## 353.

℞ Fl. ext. epigæa repens, f.  $\bar{3}$  ij  
Fl. ext. uva ursi, f.  $\bar{3}$  iss  
Spirit of nitrous ether, f.  $\bar{3}$  ss  
Label: Take a teaspoonful every two or three hours.

## 354.

℞ Tincturæ iodi,  
Olei terebinthinæ, aa. f.  $\bar{3}$  ss  
M. S. Shake and apply locally to spine night and morning.

## 355.

℞ Potassii chloratis,  $\bar{3}$  iv  
Sacchari albi,  $\bar{3}$  ij  
M. Ft. pulv.  
Sig. As directed.

## 356.

℞ Corros. chlor. mercury, gr. j  
Iodide of potass.,  $\bar{3}$  ij  
Mur. tinct. iron, f.  $\bar{3}$  ss  
Syr. sarsaparilla, f.  $\bar{3}$  iss  
Ess. of pepsin, to make f.  $\bar{3}$  iv  
Mix. Label: Teaspoonful in one half glass of water, after eating.

## 357.

℞ Benzoic acid,  $\bar{3}$  ij  
Borax,  $\bar{3}$  iss  
Syrup, f.  $\bar{3}$  j  
Water, to make f.  $\bar{3}$  iv  
Mix. Label: Dessertspoonful in water every three or four hours.

## 358.

℞ Potassii chloratis,  $\bar{3}$  ij  
Syrupi ferri iodidi, f.  $\bar{3}$  ss  
Syrupi, q. s. ad f.  $\bar{3}$  iv  
M. S. Thirty drops in a tumbler of water. Use as gargle.

## 359.

℞ Magendie's solution of morphine, f.  $\bar{3}$  ij  
Sat. solut. potass. iodide, f.  $\bar{3}$  vj  
Label: Take ten drops three times a day.

## 360.

℞ Powd. borax,  $\bar{3}$  ij  
Tinct. myrrh, f.  $\bar{3}$  ij  
Water, to make f.  $\bar{3}$  ij  
Mix. Label: As directed.

## 361.

℞  
 Calcii hypophosphitis, 3 x  
 Potass. hypophosphitis, 3 viij  
 Sodii hypophosphitis, 3 x  
 Ferri lactatis, gr. ii j  
 Strychninae lactatis, gr. iss  
 Acidi lactici, f. 3 v j  
 Elix. gentianae et tinct.  
 ferri chloridi, f. 5 viij  
 Aquæ, q. s. ad f. 5 xv j  
 M. Ft. solut.  
 S. Teaspoonful three times a day.

## 362.

℞  
 Strychnine sulph., gr. j  
 Fowler's solution, 3 ij  
 Iron and quinine citrate, 3 iv  
 Glycerin, 5 iv  
 Cinnamon water, to make 5 viij  
 Mix. Label: One teaspoonful after meals.

## 363.

℞  
 Bismuth subnitrate, 3 j  
 Ess. cinnamon, f. 3 ss  
 Glycerin, f. 3 ss  
 Carbolic acid, gtt. xxx  
 Lime water, f. 5 iij  
 Mix. Label: Shake before using. One teaspoonful in a tablespoonful of water just before meals.

## 364.

℞  
 Argenti nitratis, gr. ij  
 Glycerini, f. 3 iv  
 Aquæ, f. 3 iv  
 M. S. One drop in each eye at night.

## 365.

℞  
 Fl. ext. ergot,  
 Tr. chlor. iron, aa. f. 3 v j  
 Tr. nux vomica, f. 3 iv  
 M. L. Take thirty-five drops three times a day.

## 366.

℞  
 Sp. ætheris nitrosi, f. 5 viij  
 Ext. digitalis fl., f. 5 j  
 Mix. Label: Two tablespoonfuls a day.

## 367.

℞  
 Sod. salicylatis, 3 j  
 Pot. iodidi, 3 ss  
 Pot. citratis, 3 j  
 Sulphonal, 3 ss  
 Mix and make twelve pills.  
 Label: One every three hours.

## 368.

℞  
 Po. opium, gr. xxv  
 Silver nitrate, gr. xiiss  
 Mix and make fifty capsules.  
 Label: Take as before.

## 369.

℞  
 Potass. iodidi, 3 iij  
 Strych. sulphatis, gr. j  
 Liq. potass. arsenitis, f. 3 iiss  
 Aquæ amygd. am., q.s.ad f. 5 iv  
 M. S. Teaspoonful four times daily.

## 370.

℞  
 Tr. capsici, f. 3 j  
 Acidi carbolici, ℥ xx  
 Bismuthi subnit., 3 v  
 Alcoholis, f. 3 ij  
 Olei gaultheriæ, f. 3 j  
 Spir. ammon. aromat., f. 3 iv  
 Aquæ, f. 5 ij  
 Misc. Signa: Take one half teaspoonful as directed.

## 371.

℞  
 Antipyrin, 3 iiss  
 Caffeine, 3 ij  
 Sod. bromide, 3 v j  
 Syrup of lemon, f. 5 iiss  
 Cinnamon water, to make f. 5 iv  
 Mix. Label: Teaspoonful as needed.



## 372.

℞ Citrated caffeine, 2.0 Gms.  
 Spirit nitrous ether, 20.0 Cc.  
 Basham's mixture, 100.0 Cc.  
 Mix. Label: Dessertspoon-  
 ful three times a day.

## 373.

℞ Acidi carbolic, ʒ j  
 Tr. iodi, ʒ ij  
 Acidi tannici, ʒ j  
 Cerati, ʒ iv  
 Misce. Signa: Ointment.

## 374.

℞ Sol. of ammon. acetate, f. ʒ ss  
 Spir. of nitrous ether, f. ʒ ss  
 M. L. Teaspoonful every two  
 hours.

## 375.

℞ Potass. iodide, ʒ ij  
 Potass. bromide, ʒ vj  
 Quinine sulphate, gr. xxxvj  
 Dil. sulphuric acid, ʒ j  
 Tinct. of orange peel, ʒ vj  
 Water, to make ʒ vj  
 Mix. Label: Teaspoonful after  
 meals.

## 376.

℞ Sodii salicylatis, ʒ iiij  
 Quininae sulphatis, gr. xvj  
 Tinct. podophylli, f. ʒ ij  
 Spir. ætheris nitrosi, f. ʒ iv  
 Aquæ camphoræ, f. ʒ vj  
 M. S. Dessertspoonful twice a  
 day.

## 377.

℞ Atropine sulphate, gr. iss  
 Strychnine sulphate, gr. iiij  
 Salicylic acid, gr. v  
 Borax, gr. v  
 Water, to make ʒ ij  
 Mix. Label: Teaspoonful twice  
 a day.

## 378.

℞ Tinct. of aconite, gtt. xx  
 Spir. of nitrous ether, f. ʒ j  
 Morphine sulphate, gr. ʒ  
 Sol. of pot. citrate, to make f. ʒ ij  
 M. L. Dessertspoonful in  
 water every hour.

## 379.

℞ Citrate of potassium, ʒ j  
 Divide into sixteen powders.  
 Label: One powder in water  
 four times a day.

## 380.

℞ Carbolic acid, gtt. x  
 Monsel's solution, f. ʒ iiij  
 Glycerin, to make f. ʒ j  
 Mix. Use as gargle.

## 381.

℞ Chlor. of gold and sod., gr. xij  
 Ammonium muriate, gr. vj  
 Strychnine nitrate, gr. j  
 Atropine sulphate, gr. ʒ  
 Fl. ext. of cinchona, f. ʒ iiij  
 Fl. ext. of coca, f. ʒ j  
 Water,  
 Glycerin, of each f. ʒ j  
 M. L. One teaspoonful every  
 two hours.

## 382.

℞ Borax, ʒ j  
 Alum, ʒ j  
 Glycerin, f. ʒ j  
 Rose water, to make f. ʒ viij  
 Make solution.  
 Label: Lotion.

## 383.

℞  
 Liq. ferri dialysati, f. ̄j  
 Tinct. lavendulæ co., f. ̄j iv  
 Tinct. gentianæ co., f. ̄j iv  
 Bismuthi subnitrat, f. ̄j iij  
 Elix. lactopeptin, q. s. ad f. ̄j iv  
 M. S. Shake well and take  
 one teaspoonful after each meal.

## 384.

℞  
 Chloral hydrate,  
 Camphor, of each ̄j  
 Starch, ̄j  
 Mix. Label: Rub on as directed.

## 385.

℞  
 Quininæ sulphatis, ̄j  
 Acidi sulphurici aromat., ℥ xxx  
 Spir. ammoniæ aromat., f. ̄j ss  
 Syr. sarsaparillæ co., f. ̄j ivss  
 M. S. Dessertspoonful three  
 times a day.

## 386.

℞  
 Phosphorus, gr.  $\frac{1}{8}$   
 Strychnine sulphate, gr.  $\frac{2}{3}$   
 Soluble phosphate iron, ̄j iv  
 Detan. elixir cinchona, f. ̄j ij  
 Mix. Label: Teaspoonful three  
 times a day.

## 387.

℞  
 Tinct. nucis vomicæ, f. ̄j ss  
 Syr. ferri iodidi, f. ̄j j  
 Quininæ sulphatis, ̄j  
 Glycerini, f. ̄j ij  
 Aquæ, q. s. ad f. ̄j iv  
 M. S. Teaspoonful after meals.

## 388.

℞  
 Mercuric chloride, gr. j  
 Tartar emetic, gr. j  
 Morph. hydrochloride, gr. iij  
 Aromat. spirit of ammon., f. ̄j v  
 Syrup of liquorice, ̄j iij  
 Mix. Label: Teaspoonful  
 when coughing.

## 389.

℞  
 Hydrarg. chlor. corros., gr. iij  
 Zinci sulphocarb., gr. iv  
 Morphina sulph., gr. ij  
 Aquæ hydrogenii dioxidi, f. ̄j j  
 Aquæ rosæ, q. s. ad f. ̄j vj  
 M. S. Use as directed three  
 times a day.

## 390.

℞  
 Liquoris sodii arsenatis, f. ̄j j  
 Syrupi ferri iodidi, f. ̄j vij  
 M. S. One half teaspoonful  
 in water three times a day.

## 391.

℞  
 Tannic acid, ̄j  
 Tinct. of iodine, ℥ lxxx  
 Potassium iodide, gr. xx  
 Tinct. of myrrh, ℥ lxxx  
 Rose water, to make f. ̄j viij  
 Mix. Label: Dessertspoonful  
 in water as mouth wash.

## 392.

℞  
 Peroxide of hydrogen,  
 Glycerin, of each f. ̄j iij  
 Mix. Label: Gargle freely.

## 393.

℞  
 Sodium salicylate, ̄j iss  
 Caffeine citrate, gr. xx  
 Phenazonum, ̄j j  
 Syrup of orange, f. ̄j iij  
 Water, to make f. ̄j iv  
 M. L. Teaspoonful three  
 times daily.

## 394.

℞  
 Ammonii chloridi,  
 Sodii salicylatis, aa. ̄j iij  
 Syrupi Tolutani, ̄j vj  
 Aquæ, q. s. ad ̄j iij  
 M. S. Teaspoonful four times  
 a day.

## 395.

℞  
 Quininæ sulph., gr. xl  
 Sodii salicylatis, gr. l  
 Trional, 3 ss  
 M. Ft. pil. No. 10.  
 S. Take one three times a day.

## 396.

℞  
 Mercuric chloride, gr. j  
 Fowler's solution, gtt. xlviii  
 Syrup iodide of iron, 3 vj  
 Elixir of cinchona, to make 5 vj  
 Mix. Label: Teaspoonful after meals.

## 397.

℞  
 Ext. suprarenal gland (scale) 3 ss  
 Make powders No. 20.  
 Label: One every three hours.

## 398.

℞  
 Phenacetin, gr. xxiv  
 Syrup, 5 j  
 Water, 5 iij  
 Mix. Label: Teaspoonful every hour until temperature is lowered.

## 399.

℞  
 Quininæ sulphatis,  
 Ammonii valerian., aa. gr. xxx  
 M. Ft. pil. No. 10.  
 Sig. One three times a day.

## 400.

℞  
 Menthol, gr. xx  
 Chloroform, 3 j  
 Tinct. benzoin, 3 iss  
 Liquid albolene, 5 j  
 Mix and Label: Spray the throat every four hours.

## CRITICISMS.

### 1.

When solutions of the first two ingredients are mixed together the insoluble mercuric iodide is formed, and this is redissolved in excess of potassium iodide, forming potassium mercuric iodide, or, as it is commonly known, Mayer's reagent. This compound precipitates the alkaloids of cinchona in the elixir. The alcohol in the elixir is a solvent for this precipitate, but upon addition of the syrup the alcohol is too dilute to exercise much of a solvent effect. The syrup of rhubarb is generally turbid, and it will also cause a precipitation of some of the matter from the elixir of cinchona. The danger in such a prescription is that the patient may take most of the precipitate at one time and thereby get an overdose of the mercuric iodide, which is thrown out of solution with the alkaloids. In 4 fluid ounces of the elixir of cinchona there should be 2.8 grains of total alkaloids. This amount of alkaloids will precipitate about 4 grains of mercuric iodide. In this prescription most of the mercury will be precipitated. It should be dispensed with a "Shake well" label.

### 2.

There is enough of ammonium carbonate present to neutralize all of the sulphuric acid and liberate the free alkaloid. The quinine sulphate should be dissolved in part of the syrup with the aid of the acid, and the carbonate in the remainder of the syrup. These two solutions should be cooled thoroughly before mixing, because when warm the

free alkaloid collects in sticky masses and it is impossible to get it evenly divided. The effervescence is due to the liberation of carbon dioxide by the acid.

### 3.

If the ingredients are powdered separately and then mixed lightly together there will probably be no danger of explosion, and no chemical reaction will take place while the powder is dry. But when taken into the stomach the potassium chlorate with the hydrochloric acid of the gastric juice will undoubtedly oxidize the calomel, forming mercuric chloride. When one of the above powders was mixed with two ounces of water containing four per cent. of hydrochloric acid and the mixture allowed to stand for some time tests for mercuric chloride could be obtained. The reaction would have taken place much more quickly at the temperature of the body. Although this may be considered a rather dangerous prescription it has been filled and taken without apparent ill effect.

### 4.

Chemical reaction takes place between the ammonium carbonate and the acetic acid of the syrup of squills, liberating carbon dioxide. Care must be taken not to cork the bottle until effervescence has entirely ceased.

### 5.

This prescription was filled by dissolving the quinine sulphate in the acid and mixing with the mucilage, and then adding the oil of cloves. The potassium permanganate was dissolved in a little water and added slowly to the other mixture. Dark-brown masses were formed, consisting of coagulated acacia holding in it the manganese dioxide, the permanganate being reduced. It was almost impossible to mix these masses so as to make a homogeneous mixture or

even one that would pour readily. On standing a few hours the manganese dioxide is further reduced to manganous sulphate and the mixture becomes colorless. The patient using this prescription had it refilled several times.

## 6.

The alcohol of the tincture throws the acacia out of solution and the water of the mucilage precipitates the resin from the tincture so that a white precipitate ultimately forms in the bottom of the bottle. A fresh tincture of guaiac with mucilage of acacia gives a blue color but an old tincture gives a brown-red color. With the consent of the physician the prescription was filled by using glycerin and water instead of mucilage.

## 7.

The sodium hypophosphite is deliquescent in damp air and the powders become moist. Chemical reaction then takes place, causing the mixture to become yellow and finally black. The hypophosphite reduces the bismuth to a yellow and then a black compound, in which the quantivalence of bismuth is two, while the hypophosphite is oxidized to a phosphate. The dampening of the extract of *nux vomica* also tends to darken the mixture. By adding some *althea* and using oiled or parchment paper the mixture can be dispensed without difficulty. The directions translated into English are: Mix, make a powder, and divide it into 25 equal parts.

## 8.

The mercuric chloride combines with the sodium and ammonium iodides, forming insoluble mercuric iodide, which redissolves in excess of the alkali iodides, forming a double compound that precipitates some of the constituents of the compound syrup of *sarsaparilla*. Ammonium iodide very

frequently contains a little free iodine, which probably combines with some of the organic matter present in the syrup. There is no danger of the potassium chlorate liberating iodine from the iodides so long as the mixture is neutral or alkaline. Corrosive sublimate is slowly reduced to calomel by the compound syrup of sarsaparilla (U. S. D., 689).

### 9.

If the first two ingredients are triturated together an explosion is liable to occur. If, however, they be dissolved separately in the water and then mixed there is probably no danger. If the solution were acid chemical reaction would take place with the formation of hydrochloric and phosphoric acids.

### 10.

When these two substances are rubbed together in a mortar with considerable force a damp powder or a soft mass is formed which soon dries. By powdering the ingredients separately and then mixing no difficulty is experienced. The mixture does not make a clear solution in water, an aluminum salt being precipitated.

### 11.

This mixture is quite frequently prescribed by physicians, even by those who know that it is incompatible. A chemical reaction takes place between the nitrous ether and the tannin in the buchu, causing an evolution of oxides of nitrogen. Spirit of nitrous ether sometimes reacts with an aqueous solution of potassium acetate, giving off a gas, the composition of which has not been definitely determined. The gas must be allowed to escape before corking the bottle. Some of the resinous matter in the fluid extract will be precipitated by the water.

## 12.

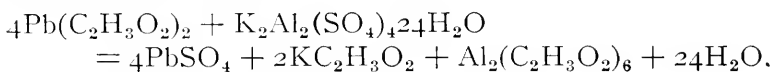
The tannin in the tincture of digitalis makes a black inky mixture with the tincture of iron. The phosphoric acid added to the tincture of iron before the two tinctures are mixed partially prevents, or if added after partially destroys, the inky color, the final mixture being dark brown and turbid. If two drams of dilute phosphoric acid be added to the tincture chloride of iron the mixture becomes entirely colorless, due to the formation of ferric phosphate, and on the subsequent addition of a tannin solution the black color is not produced. A little light-colored precipitate is formed.

## 13.

The quinine sulphate and the lead acetate react, forming quinine acetate and lead sulphate, both of which are practically insoluble in the syrup. The bismuth subnitrate is also insoluble. In filling this prescription it is best to add about twenty grains of powdered tragacanth to aid in suspending the insoluble substances. A "Shake well" label should be put on the bottle.

## 14.

Alum, being a soluble sulphate, will react with the lead acetate, precipitating the insoluble lead sulphate according to the following equation:



The precipitate should not be filtered out.

## 15.

The tannic acid combines with the quinine, forming the nearly insoluble quinine tannate. This prescription should be filled by dissolving the quinine sulphate in a part of the



syrup with the aid of the sulphuric acid. The tannic acid should be dissolved in the remainder of the syrup and this gradually added to the other solution with constant stirring. Both solutions should be cold, because if mixed when warm the precipitate formed is sticky and will make a mass that cannot be evenly divided.

### 16.

Emulsify the cod-liver oil by adding it in portions to the lime water in a bottle. Then add the oil of wintergreen, the syrup, and the syrup iodide of iron. The calcium hydrate of the lime water saponifies a small amount of the cod-liver oil, which soap helps to emulsify the balance of the oil. When the syrup of ferrous iodide is added to the mixture containing the calcium hydrate ferrous hydrate is precipitated. Ferrous hydrate if free from ferric hydrate is white, but it quickly oxidizes to ferroso-ferric hydrate, which varies from a dirty green to almost black. After some time it is oxidized to a yellow-brown basic ferric oxide. This prescription will go through these various colors.

### 17.

Donovan's solution precipitates many alkaloids from aqueous solutions of their salts. Quinine is no exception. This prescription was filled by dissolving the quinine sulphate in most of the syrup with the aid of the acid; dissolving the potassium iodide in the remaining syrup and adding to the first solution. Donovan's solution was then slowly added with constant stirring and the prescription sent out with a "Shake well" label. The danger in such a prescription does not come from the quinine which is precipitated, but the mercuric salt which is precipitated with the quinine. In concentrated solutions of quinine potassium iodide gives a precipitate. At the end of two days all of the mercury was precipitated and some iodine was liberated, the sulphuric acid displacing the hydriodic acid and the air oxidizing the hy-

driodic acid. Any quinine not precipitated by the Donovan's solution was precipitated by the iodine.

### 18.

There is not a sufficient amount of water to dissolve all of the quinine sulphate. If the sodium salicylate is dissolved in part of the syrup and the quinine is mixed with the balance of the syrup and these two brought together a bulky gelatinous precipitate of quinine salicylate is formed. The resulting mixture is so thick that it can be poured only with difficulty. When a little sulphuric acid is used to aid the solution of the quinine sulphate, the precipitate of quinine salicylate subsequently formed is generally more bulky and tenacious.

### 19.

The mercuric chloride precipitates the strychnine sulphate as a double compound, which is soluble in a fairly strong alcohol, less soluble in the presence of hydrochloric acid. This prescription deposits a precipitate of long needle-shaped crystals on standing a few hours, but not immediately on filling. If the first ingredient is omitted no precipitation takes place within at least twenty-four hours, although there is danger of precipitation after the patient has received it. The addition of a few drops of hydrochloric acid quickly brings it down. This prescription as written should not be filled. If the mercuric chloride be omitted there will be but little danger of precipitation.

### 20.

If the first two ingredients are dissolved in separate portions of the elixir and then mixed a clear solution results. This, however, becomes turbid in a few minutes, and the liquid separates into two layers, the upper one having somewhat of an oily appearance. This oily liquid is chloral alco-

holate, formed from the chloral hydrate and the alcohol of the elixir. Just what part the potassium bromide takes in the reaction seems not to be well understood, unless it be to render the alcoholate less soluble in the elixir. Other inorganic salts, such as sodium bromide or sodium chloride, act in a similar way. If there is not more than about ten grains of chloral hydrate and ten grains of potassium bromide in a dram of the solution there is but little danger of the chloral alcoholate separating. Chloral alcoholate is more soluble in alcohol than it is in water, and by the addition of a little more alcohol the separation of the two fluids can sometimes be prevented. This prescription when filled as written may be considered a dangerous one. Several cases have been reported where alarming symptoms have been caused by the taking of a teaspoonful of chloral alcoholate. On filling a similar combination, if a turbidity results the mixture should be kept until it can be determined whether there will be a separation into two layers, and if so, then remedied by adding a little alcohol or putting on a "Shake well" label.

## 21.

A reaction takes place between the first two ingredients, with the precipitation of lead sulphate. All of the lead is precipitated. If the lead subacetate is dissolved in water and then added to the tinctures it will precipitate the alkaloids of the opium as well as other matter. Water also causes a precipitation of the resinous matter from the tinctures. This prescription should be dispensed without filtering, but with a "Shake well" label.

## 22.

Mercuric chloride combines with albumin to form a compound insoluble in water. The presence of an equal weight or more of sodium or ammonium chloride prevents to a considerable extent the formation of the precipitate. "By

dissolving one part of corrosive sublimate and a hundred parts of common salt in distilled water and evaporating to dryness a soluble double preparation is obtained which does not coagulate albumen." (U. S. Dispens., 689.) If this prescription were filled as directed it would be practically inert. By adding three or four grains of ammonium chloride to the mercuric chloride, dissolving this in about one half the water and the albumin in the remainder of the water, and mixing these solutions, a nearly clear solution can be obtained.

### 23.

Sodium phosphate requires 5.8 parts of water to dissolve it; consequently in this prescription it would not be all dissolved. It should be powdered before adding to the syrup and water and the prescription then dispensed with a "Shake well" label.

### 24.

The syrup of garlic contains acetic acid, which combines with the ammonium of the ammonium carbonate, liberating carbon dioxide. The reaction should be completed before the bottle containing the solution is corked, or the pressure of the gas formed may be sufficient to burst the bottle.

### 25.

The zinc is entirely precipitated by the borax, producing a white flocculent precipitate of zinc borate or a mixture of the borate with a basic compound. The prescriber should be advised of this fact. If the prescription is dispensed the precipitate should be filtered out.

### 26.

The spirit of nitrous ether is generally acid in reaction, and when an acid solution of nitrous ether is brought in con-

tact with potassium iodide, iodine is liberated and the gas nitric oxide is formed. This prescription should not be filled on account of the free iodine formed.

## 27.

Several chemical reactions occur, depending on the order of mixing the ingredients. The possible reactions are as follows: 1. The potassium iodide in the compound tincture of iodine when mixed with a solution of ferric chloride forms free iodine, potassium chloride, and ferrous chloride. 2. Fowler's solution is alkaline, due to the presence of potassium bicarbonate and perhaps some normal potassium carbonate. This carbonate neutralizes part of the free hydrochloric acid when mixed with the tincture of iron, forming potassium chloride and carbon dioxide. 3. Ferric chloride with phosphoric acid forms the colorless ferric phosphate, which is insoluble in water, but soluble in water containing free acid. 4. Tincture chloride of iron dissolves quinine sulphate, the free acid of the tincture combining with the quinine sulphate to form a more soluble compound. 5. The iron combines with tannic acid in the rhubarb, forming the black tannate of iron. 6. The free iodine in the compound tincture of iodine combines with sulphate of quinine, forming an insoluble compound. 7. The free iodine will also combine with the tannin in the rhubarb. 8. The alkali in Fowler's solution will neutralize part of the phosphoric acid when mixed with it. 9. The alkali in Fowler's solution when mixed with a solution of quinine sulphate combines with the sulphuric acid, liberating and precipitating the free alkaloid. 10. The phosphoric acid is a solvent for quinine sulphate, probably combining with it and under certain circumstances again precipitating it. 11. A solution of quinine sulphate is precipitated by the tannic acid of the rhubarb, forming the insoluble tannate of quinine.

In whatever way the ingredients are mixed the combination is an extremely inelegant one; it is black and inky in

color and taste, and the quinine and rhubarb are not in solution.

### 28.

Pure ferric pyrophosphate of iron is insoluble in water. The official soluble pyrophosphate of iron may be a double compound of sodio-ferric citro-pyrophosphate, or it may be a mixture of ferric pyrophosphate and sodium citrate, the former being soluble in a solution of the latter. When sulphuric acid is added to the solution of this compound or mixture the ferric pyrophosphate is precipitated, the sulphuric acid probably combining with the sodium and liberating citric acid. The quinine is not precipitated.

### 29.

This makes a clear brownish-red solution, which on standing two or three days loses much of its color. The color varies with the proportion of free iodine which also varies with the condition of the soap liniment. Soap, oil of rosemary, and camphor all reduce the iodine to some extent. In some cases all of the iodine is changed so that it no longer gives a test with starch. The products formed are not well known.

### 30.

An old specimen of bismuth and ammonium citrate is generally not entirely soluble in water unless a little ammonia water is added. At best the solution of this salt is usually slightly alkaline, and the pepsin on being added to this is rendered inert by the alkali. If, however, the hydrochloric acid is used in dissolving the pepsin in water and this solution added to the bismuth and ammonium citrate dissolved in the balance of the water, the action of the pepsin will not be destroyed, but a precipitation will take place. This precipitate is bismuth citrate, the hydrochloric acid breaking up the double salt and combining with the ammonia. Pepsin should

not be prescribed with bismuth and ammonium citrate, as one or the other loses much of its activity. When such a prescription is to be filled it is best to dissolve each ingredient separately, making each solution neutral before mixing them.

### 31.

When the sulphurous acid is added to the solution of the sodium hypophosphite in the cinnamon water a turbidity results, due to the separation of free sulphur. The hypophosphite is oxidized to a phosphate and the sulphurous acid is reduced to sulphur. In the presence of a very large excess of the hypophosphite the sulphur is further reduced to hydrogen sulphide.

### 32.

Potassium iodide is hygroscopic in a moist atmosphere and powders containing it usually become damp. There is no reaction between calomel and potassium iodide if the mixture is dry, but mixed in the above proportions in the presence of moisture a dark-gray powder is produced. Mixed in more nearly equal proportions a yellowish-green powder is formed. Chemical reaction takes place, with the formation of potassium chloride and mercurous iodide, which is yellow. The mercurous iodide is decomposed by the excess of potassium iodide, forming a double salt of potassium and mercuric iodide and metallic mercury, and it is the metallic mercury that gives the mixture the gray color. This prescription should not be dispensed, because of the oxidation of the mercurous compound to the much more active mercuric compound, or if it is, the dose should be reduced to correspond with that of the mercuric salt. The directions are: Mix, make a powder, and divide into 10 powders (papers).

### 33.

If the acid is added to the tincture a red coloration is formed at contact of the two liquids. This red color quickly

changes to an orange and then to a yellow when the liquids are mixed. The changes in color are probably due to the action of the acid on the brucine. If now the mixture is allowed to stand a short time a chemical reaction is evidenced by the evolution of bubbles of gas. This reaction continues slowly for several hours, and is due to the acid acting on the organic matter other than the alkaloids, probably tannin. The dilution with the elixir does not prevent it. On adding the acid or the elixir to the tincture a precipitate of inert matter is produced.

### 34.

There is not enough of water to dissolve all of the quinine sulphate, as it requires 740 parts of water. The water will precipitate inert extractive matter from the tincture. While potassium iodide does not always precipitate strychnine sulphate when in solution with it, there is some danger of precipitation. (See the incompatibilities of strychnine.) The usual maximum medicinal dose of strychnine sulphate is  $\frac{1}{12}$  of a grain. In this prescription the dose is  $\frac{5}{16}$  of a grain and is dangerously large. The prescription should not be dispensed without first having called the prescriber's attention to that fact, as well as to the possibility of the strychnine being precipitated by the potassium iodide.

### 35.

The wine of pepsin of the National Formulary contains hydrochloric acid and the syrup of ipecac contains acetic acid. There is a sufficient amount of ammonium carbonate to neutralize both of these acids and render the solution alkaline, thereby destroying the activity of the pepsin. In the reaction carbon dioxide is given off and the bottle must not be corked until the reaction is complete, for the pressure of the gas might burst the bottle.



## 36.

If the directions to rub these solids together be followed an explosion will probably result. Potassium chlorate forms an explosive mixture with each of the three other ingredients. Each substance should be powdered separately and all mixed together lightly. Some pharmacists would decline to fill this prescription. If filled, however, the patient should be informed of the nature of the mixture and cautioned to keep it where there will be no danger of its receiving a blow between two hard surfaces.

## 37.

If these ingredients are mixed together and allowed to stand the oil of turpentine will rise to the top. The oil should first be emulsified with the syrup and about forty-five grains of acacia and then the other liquids added. When water is added to paregoric the oil of anise and the benzoic acid are precipitated, but these would be held in suspension by the emulsion. Sometimes the solution of ammonium acetate is alkaline, there having been an excess of ammonium carbonate or a deficient amount of acetic acid used in making it. In such a case the acid in the syrup of squills will liberate carbon dioxide.

## 38.

Evidently the prescriber wished to air a little of his knowledge or then had some kind of an agreement with a certain pharmacist to fill his prescriptions. It is unusual to employ the chemical symbols in writing prescriptions, and it can hardly be expected that the dispenser will know and remember such complicated formulas as the first one and of a compound which is used comparatively seldom.  $C_{18}H_{21}NO_3$  is codeine, KI is potassium iodide,  $C_3H_8O_3$  is glycerin, and  $H_2O$  is water.

This prescription was filled by dissolving the codeine in

the glycerin and part of the water. The iodide was dissolved in the remainder of the water and the two solutions mixed, without any precipitation occurring at once. After several days, however, there was a deposit of very fine crystals. Potassium iodide precipitates quite a number of the alkaloids from their solutions. This precipitation can be prevented by having a small amount of alcohol present.

### 39.

The potassium chlorate is soluble in about 16 parts of water; consequently only a small proportion is dissolved in the three ounces of water. Some pharmacists would contend that the excess of the chlorate in a powdered condition should be left in the bottle, so that the patient could add water to it as the liquid was used up. This might be all right if it were a simple mixture of the chlorate and water. But in the above prescription, since the fluids are all more or less medicinal, it is evident that the physician wanted only a saturated solution of the chlorate and the excess removed. The resinous matter of the tincture is precipitated by the water. The fluid hydrastis colorless is a preparation which seems to vary much in composition. The U. S. Dispensatory gives a method of making it which consists in dissolving twenty grains of hydrastine sulphate in one pint of a mixture of equal parts of glycerin and water.

### 40.

The copaiba when mixed with the tinctures does not make a clear solution, as it requires from three to four times its amount of alcohol, although it is readily soluble in absolute alcohol. On the further addition of glycerin the mixture was made more turbid and the syrup when added threw out of solution most of the copaiba, which had been dissolved by the alcohol of the tinctures. On standing the copaiba rises to the top, but the syrup and glycerin are viscid enough to

hold it in suspension for some little time, so that the patient can get a uniform dose. Or this can be made into an emulsion with the aid of some acacia. It should be dispensed with a " Shake well " label.

**41.**

When the first two ingredients are rubbed together the liquid chloral camphor is formed. This will not dissolve all of the cocaine hydrochloride for which the prescription calls. 5 Dg. is 5 dekagrams or 50 grams, which is undoubtedly a mistake. The prescriber probably meant 5 dg., which is 5 decigrams or one half of a gram. That being the case, the cocaine can be readily mixed with the oily liquid.

**42.**

Strong nitric acid decomposes creosote, with the formation of red fumes. Dilute nitric acid converts it into a brown resin. (U. S. Dispensatory, 17th ed., 450.) In filling this prescription the nitric acid should be slowly added to the creosote with constant stirring. A considerable heat is generated by the reaction, and the mixture should be allowed to cool before adding the chloroform, so that it will not be volatilized. It is doubtful if this prescription has much caustic effect.

**43.**

Chloral hydrate is decomposed by alkalies, forming chloroform and a formate of the base. Borax is sufficiently alkaline so that chloroform will be slowly generated and can be recognized by the odor.

**44.**

There is considerable danger of having an explosion in attempting to fill this. If the potassium chlorate is rubbed with the glycerin explosion is liable to take place. Or if

the chlorate be added to the solution of ferric chloride, which always contains some free hydrochloric acid, chlorine will be formed, and this will act upon the glycerin, converting it into oxalic and carbonic acids. In filling this the temperature should not go above 70° F., and then the bottle should be loosely stoppered for a time before giving to the patient. The chlorate is not entirely dissolved.

#### 45.

The amount of chlorine formed will depend upon the order of mixing the ingredients. If the potassium chlorate and hydrochloric acid are mixed and then the water added a yellow liquid containing much free chlorine with oxides of chlorine will result. If, however, the salt is first dissolved in water and then hydrochloric acid added the amount of chlorine formed will be small. The physician has not indicated which was wanted, but probably the latter, as the former would be exceedingly irritating.

#### 46.

The usual maximum dose of the tincture of lobelia is sixty minims. This prescription calls for twice that amount. The doses of the other two tinctures are rather large, although not above the maximum. Taking into consideration the fact that the mixture is to be taken every hour, it may be considered a dangerous one and the prescriber should be consulted. Another evidence of a mistake having been made is seen in the fact that a three-ounce mixture is obtained without using any of the compound syrup of squills at all. Perhaps the physician intended to have omitted the "q. s. ad," thus making a six-ounce mixture.

#### 47.

No change is noticed in the appearance of this mixture on standing unless exposed to sunlight when it becomes a dirty

gray. The odor is still prominent at the end of a month. According to the U. S. D. the odor of the iodoform slowly diminishes, due to the decomposition caused by the tannic acid.

#### 48.

On triturating these two substances together the mixture becomes black. Ammonium carbonate acts like ammonium hydrate, forming the black compound nitrogen dihydrogen dimercurous chloride ( $\text{NH}_2\text{Hg}_2\text{Cl}$ ). There seem to have been no physiological experiments made with this compound, but, as acids decompose it, probably the gastric juice breaks it up into calomel and ammonium chloride. The ammonium carbonate probably increases the action of the calomel, and may possibly tend to the formation of some mercuric salt.

#### 49.

The dose of potassium cyanide is dangerously large, the usual maximum dose being about one fourth of a grain. The physician, knowing that morphine acetate frequently is not entirely soluble, has directed the use of acetic acid. The excess of acid combines with the potassium, liberating hydrocyanic acid. The potassium cyanide frequently contains a carbonate as an impurity, and in such case might neutralize the free acid and precipitate some of the free morphine. In neutral solutions the potassium cyanide precipitates morphine cyanide from morphine salts. Morphine cyanide is soluble in acid solutions. The prescription should not be filled.

#### 50.

The alcohol in the spirit and tincture as well as the ferric chloride gelatinizes the mucilage of acacia. The gelatinous mass will slowly dissolve in the syrup on standing. The best way to fill the prescription is to dilute the tincture with part

of the syrup and mix the rest of the syrup with the spirit and then these with the mucilage. In this way the gelatinization is avoided.

### 51.

Several chemical reactions are possible in filling this prescription, depending upon the order of mixing the ingredients. If the potassium bicarbonate is added to the syrup of lemon carbon dioxide will be liberated by the citric acid. Spirit of nitrous ether is usually acid with nitrous and nitric acids, and these will liberate the carbon dioxide if brought in contact with the bicarbonate. The solution of potassium hydrate is capable of neutralizing the acid in the spirit or part of that in the syrup. The spirit of nitrous ether if added directly to the fluid extract will cause a reaction, with the evolution of red fumes. This will not take place as readily if the solution of potash is added to the spirit first. Some of the resinous matter in the fluid extract is precipitated by the syrup. The gas which is formed should be allowed to escape before corking the bottle; otherwise an "explosion" might result.

### 52.

This prescription resembles Blaud's pills, inasmuch as the potassium carbonate reacts with ferrous sulphate in the presence of moisture to form the green ferrous carbonate. This ferrous carbonate oxidizes in the air, forming ferric oxide, and to prevent this some sugar should be added. The potassium carbonate with mercuric chloride gives the red-brown oxychloride of mercury, and with strychnine sulphate it gives the free alkaloid. As the mixture is to be made into pills, and the compounds formed are not more active than those prescribed, there need be no hesitation about filling the prescription. It may be filled by following the general directions in the U. S. P. for making Blaud's pills. The mass is strongly alkaline.

**53.**

If these three ingredients are mixed in the absence of moisture no change in appearance is noticeable. In the presence of moisture the mixture at once begins to turn gray. This is due to the formation of metallic mercury and mercurous oxide, while at the same time some mercuric chloride is formed (M. M. R., VII. 492). The sodium bicarbonate seems to play some part in the reaction since calomel and antipyrin with water do not readily darken. This should be considered a rather dangerous prescription.

**54.**

On standing the citric acid in the syrup combines with the sodium, liberating salicylic acid, which, being only sparingly soluble in water, is precipitated in needle-shaped crystals. This can be dispensed as a shake mixture. The precipitation is rather tardy, and it would be well to inform the patient of the change which will take place.

**55.**

Reaction takes place between the potassium iodide and the ferric chloride, forming free iodine, ferrous chloride, and potassium chloride. Potassium iodide and spirit of nitrous ether react, forming free iodine and nitric oxide. Gentian is said to contain no tannin, but the other drugs with which it is combined in the compound tincture do. The tannin combines with the iron to form the black inky ferric tannate. This prescription should not be dispensed on account of the free iodine formed. The iodine is not precipitated.

**56.**

If the solution of dialyzed iron has been improperly made and is strongly acid no precipitation occurs. But if it is nearly neutral, as it should be, ferric hydrate is precipitated

by the alkali that is in Fowler's solution. The ferric hydrate forms with the arsenic an insoluble compound of basic ferric arsenite, which to some extent changes to ferrous arsenate. Though liquid at first the mixture may gelatinize after several days.

### 57.

Giving but a glance at this prescription we would conclude that it should not be dispensed, that the strychnine would be precipitated. But upon closer study we find that the solution of strychnine, B. P., is an acid hydro-alcoholic solution containing about one per cent. of strychnine hydrochloride. On adding sodium bicarbonate to this the hydrochloric acid combines with it, and the strychnine is liberated, but not precipitated. Strychnine (free alkaloid) is soluble in about 6700 parts of water. In this prescription we have only about .015 Gm. in 100 Cc., or 1 part to 7500 of water, a sufficient amount of water to keep the alkaloid in solution.

### 58.

In making Fowler's solution the excess of potassium bicarbonate used is changed to the carbonate by boiling and the carbonate makes the solution alkaline. Potassium carbonate precipitates a solution of mercuric chloride as the basic mercuric chloride. In this prescription there may be a red-brown precipitate of the oxychloride of mercury but more generally a white precipitate of calomel forms. An arsenite in an alkaline solution reduces mercuric chloride to mercurous chloride and in excess to metallic mercury. Had the prescriber used the solution of arsenous acid instead of potassium arsenite no trouble would have resulted. The compounder should neutralize the Fowler's solution with hydrochloric acid before adding to the solution of mercuric chloride.

### 59.

On dissolving the quinine sulphate in part of the cinnamon water with the aid of the sulphuric acid, then adding the



potassium acetate previously dissolved in the remainder of the water, a voluminous precipitate of quinine acetate is obtained. Quinine acetate is only sparingly soluble in water, and the amount here formed is so large and bulky that it is difficult to pour out an even dose.

### 60.

Different results are obtained, according to the order of mixing the ingredients. If the Fowler's solution is added to the solution of dialyzed iron ferric hydrate is precipitated, and this combines with the arsenic to form an insoluble basic ferric arsenite. But if the syrup is added to the iron and the Fowler's solution is diluted a little with water and then added to the iron, little or no precipitation takes place. Sugar to some extent acts as a solvent for the ferric hydrate. Solution of dialyzed iron varies considerably in the amount of acidity which it has; if properly made it is nearly neutral. Some samples are sufficiently acid to prevent any precipitation by Fowler's solution. There is some danger of the strychnine being precipitated by the alkali in the Fowler's solution. Syrup or water added to the tincture of cinchona causes a turbidity. The tannin in the tincture will make a black mixture with the iron. To avoid the precipitations noted above the solution of potassium arsenite should first be neutralized with hydrochloric acid; or a better way would be to get the prescriber to use the solution of arsenous acid instead of potassium arsenite. The directions translated into English are: Mix. Label: Let a teaspoonful be taken after dinner.

### 61.

The dose of aconitine is entirely too large unless the particular sample to be used has been proved to be comparatively inert. Two and one half grains of a so-called aconitine have been taken without ill effects, while  $\frac{1}{128}$  of a grain has been reported to have caused death. The commencing

dose of absolute aconitine should not be much over  $\frac{1}{600}$  of a grain. In this prescription there are several physiological incompatibilities. In action aconitine is more or less opposed to morphine, strychnine, and belladonna. Morphine is to some extent antagonistic to atropine and strychnine, and atropine to strychnine.

### 62.

This makes a clear colorless solution at first. In a day or two it acquires a yellow color which deepens. The products formed have not been determined. A similar prescription containing glycerin is sometimes written, and it does not change in color so readily.

### 63.

The mercuric chloride and ferrous iodide react to form mercuric iodide and ferrous chloride. The insoluble red iodide of mercury thus formed is redissolved in the excess of ferrous iodide. The creosote requires 150 parts of water for solution. In this case there is an excess of creosote, and it forms an oily layer on top unless it is emulsified. Occasionally the solution of ammonium acetate is alkaline, and in such a case it might give a precipitate with the mercuric chloride, forming ammoniated mercury, and with the ferrous iodide, forming ferrous carbonate.

### 64.

The ingredients of this prescription can be mixed so as to make a homogeneous mass, but on standing for a few days the balsam separates from the petrolatum. This can be prevented by incorporating one and a half drams of simple cerate or of lanolin in place of a like amount of petrolatum. The odor of iodoform is gradually lost, due, according to the U. S. P., 741, to the formation of a new compound.

## 65.

This gives a clear solution at first but after a day or two a precipitate is formed. The precipitate gives a test for both arsenic and iodine. There may be an oxy-iodide of arsenic formed. If this mixture is dispensed at all it should be with a " Shake well " label.

## 66.

The euphorin, aristol, tannic acid, and alum can be triturated together, producing a powder. On adding the crystallized carbolic acid to this mixture, it becomes very soft, almost liquid. This change is the result of bringing carbolic acid in contact with the euphorin, these two substances liquefying when triturated together. The mass with the oil of theobroma makes a mixture too soft to be made into suppositories. It is necessary to render it firmer by the addition of wax, spermaceti, or some absorbing powder, as starch or slippery elm.

## 67.

Although the sulphuric acid aids the solution of the quinine sulphate, it precipitates the glycyrrhizin of the fluid extract. The glycyrrhizin, thus precipitated as glycyrrhizic acid, loses much of its sweet taste and no longer disguises the taste of the quinine. It would have been better if the prescriber had omitted the sulphuric acid and directed a shake mixture. The water causes the separation of a small amount of inert matter from the fluid extract.

## 68.

Several chemical reactions take place, depending upon the manner of filling this prescription: 1. Between the hydrochloric acid in the tincture and the potassium chlorate, liberating chlorine. 2. The chlorine thus formed may act upon

the glycerin or alcohol. 3. Between the hydrochloric acid and the ammonia and glycyrrhizin in the fluid extract, precipitating the glycyrrhizic acid. 4. Between the iron and tannic acid in the fluid extract, giving the black tannate of iron.

### 69.

The dose of the arsenic and of the strychnine is between  $\frac{1}{7}$  and  $\frac{1}{8}$  of a grain in this prescription. The maximum dose of each, as generally given, is not over  $\frac{1}{10}$  of a grain. The prescriber should be consulted. Moreover, each pill would contain about seven grains of medicinal matter, which, considering the bulky quinine sulphate and extract of gentian, makes a very large pill. Where such a large pill is prescribed, twice as many pills are sometimes made as directed and then the number to be taken at one time is doubled.

### 70.

Water can be added to carbolic acid, until the proportion is about 3 parts of acid to 1 part of water, forming a clear solution (Allen, Organic Analysis, 11, 537). On adding more water the acid separates as an oily liquid, going to the bottom. When water has been added so that the proportion is about 1 part of acid to 15 parts of water, a clear solution again results. In this prescription there will be a layer of liquefied acid in the bottom of the bottle. If the brush should remain in the bottle between the periods of using it there is danger that it will become saturated with the strong acid and that the patient will apply it in this condition. By the use of two drams of glycerin in place of part of the water a clear solution can be made, and this is what the dispenser should use.

### 71.

If the tincture of iron is added directly to the mucilage of acacia the acacia is gelatinized by the iron. This gelatinous

mass will redissolve after standing for some time with the other ingredients, but can be avoided by diluting the iron with the other ingredients first. When an acetate or acetic acid is added to a solution of a ferric salt the solution turns a deep red, due to the formation of ferric acetate.

## 72.

Different results may be obtained by changing the order of mixing these ingredients. If the corrosive sublimate is dissolved in the water and then added to the lime water the yellow mercuric oxide is precipitated. This if mixed with the mucilage and allowed to stand for some time changes to a dirty-brown color. If the lime water is added to the solution of mercury the red-brown basic chloride of mercury is precipitated. If the solution of mercuric chloride is added to the mucilage of acacia and then the lime water added to this no precipitation of mercury takes place. On allowing this to stand for a few days a flocculent precipitate is formed, slowly increasing. Acacia prevents the precipitation of a number of the heavy metals by the alkaline hydrates.

## 73.

The bismuth subnitrate is insoluble in the syrup, but a chemical reaction takes place between it and the hydriodic acid, as is evidenced by the change in color. Bismuth subnitrate is white; on mixing it with the syrup the color becomes yellow, and within a few minutes it turns to a dark brown and then grayish black. On allowing the precipitate to settle it appears to be a mixture of two compounds, one yellow and the other dark gray. According to Watts' Dictionary, the oxyiodide of bismuth is copper-colored and the bismuth iodide is a brilliant gray.

## 74.

Some samples of pepsin are hygroscopic and in such a case the powders may become damp. Pepsin is rendered

inert by alkalies, as sodium bicarbonate. The prescriber said that he gave the soda where the bowels are locked to some extent, so as to neutralize the acid and allow freer movements.

### 75.

The sodium phosphate of the U. S. P. is the  $\text{Na}_2\text{HPO}_4$  and is slightly alkaline to litmus. This alkalinity may cause precipitation of the strychnine, and it should be neutralized with a little phosphoric acid before the solutions of sodium phosphate and strychnine sulphate are mixed.

### 76.

If the turpentine is poured upon the iodine violent chemical reaction results, with the formation of violet fumes of vaporized iodine, caused by the heat generated. While there is not enough of alcohol to dissolve all of the iodine, it is best to dissolve as much as possible before adding the turpentine, which should be added in small portions, cooling the mixture if necessary. Upon standing the liquid separates into two layers. The lower one, being much smaller in amount and very dark colored, is probably the alcohol holding most of the iodine in solution; the upper stratum is very much lighter in color and is probably the turpentine. Turpentine and alcohol are not miscible in all proportions.

### 77.

According to the National Formulary, Hall's solution of strychnine contains  $\frac{1}{8}$  of a grain of strychnine acetate to the dram, together with some acetic acid. Fowler's solution contains, besides the potassium arsenite, some potassium bicarbonate or carbonate (formed by the boiling of the bicarbonate in water). This carbonate will react with the acetic acid, liberating a little carbon dioxide and forming potassium acetate. If there is an excess of the alkaline carbonate the strychnine will be liberated as the free alkaloid. The

strychnine will not be precipitated, however, as it is soluble in 110 parts of alcohol, and the prescription can be filled without difficulty.

78.

The resinous matter in the tincture of myrrh is precipitated by the syrup. By adding the tincture to the syrup in small portions and shaking well after each addition the resin comes down in a form in which it can be more readily suspended in the liquid. Tannic acid combines with the morphine to form a compound insoluble in water. It is difficult if not impossible to get an even dose of morphine.

79.

In filling this prescription each of the salts was dissolved in separate portions of water. The potassium iodide solution was added to the mercuric chloride solution, and at first there was a red precipitate of mercuric iodide, which was dissolved by the further addition of the potassium iodide, forming the soluble potassium mercuric iodide. On the addition of the ammonium carbonate solution to this no change of any kind was noticed. However, when the ammonium carbonate solution was added to the mercuric chloride solution a white precipitate of ammoniated mercury was formed. On adding the potassium iodide solution to this mixture the precipitate disappeared and a clear nearly colorless solution was formed. Probably the ammoniated mercury was decomposed and the soluble double compound of potassium mercuric iodide was formed.

80.

When the ingredients of this prescription are mixed the liberation of iodine commences at once and continues for some time. The wine and spirit were mixed and neutralized with ammonia, thinking thereby to prevent the formation of

iodine. However, iodine was set free within an hour and in two hours the liquid had assumed a dark-brown color. When an excess of ammonia is used a dark-green color is produced, probably due to the formation of a ferroso-ferric compound, and the liberation of iodine is prevented for a time. Such addition of ammonia is not admissible. Filled as written the iodine is precipitated in time. The prescription should not be dispensed.

### 81.

This mixture in a short time becomes yellow and within twenty-four hours it changes to a light brown. The coloration is due largely to the action of the nitrous acid on the morphine. Less change takes place if the mixture is neutral. The morphine is converted into nitroso-morphine, pseudo-morphine, and another base (M. & M., III. 436).

### 82.

Potassium chlorate with organic matter makes a mixture which can be quite easily exploded. A store was nearly demolished and the compounder received serious injuries by an explosion caused by rubbing salicylic acid and potassium chlorate in a new Wedgwood mortar. If the ingredients are powdered separately and then mixed lightly there is but little danger to the pharmacist. Perhaps the patient should be informed of the nature of the mixture.

### 83.

The pharmacist who received this prescription in attempting to fill it rubbed the three ingredients together dry and caused an explosion, whereby he was quite severely injured. The explosion was due to the reaction between the chlorate and hypophosphite. The pills can be made by powdering the ingredients separately, then mixing lightly with powdered extract of liquorice and massing with water.



## 84.

Iodine is soluble in about 10 parts of alcohol. As much of the iodine as possible was dissolved in the alcohol and then the camphor dissolved in this. This solution was then gradually added to the mercurial ointment with constant trituration and the water was added last. On standing a few minutes a red precipitate was formed and the mixture separated into three layers. In the bottom was this red precipitate, probably mercuric iodide, then a layer of fatty matter, and on top a hydro-alcoholic fluid containing free iodine. This mixture was such that it could be shaken up and applied. On the third day the red precipitate had disappeared, leaving the yellow fatty matter and a fluid somewhat red and containing a little free iodine. Seven days later the liquid was yellowish brown and contained only a trace of iodine. Part of the iodine probably combined with the mercury to form mercuric iodide, and part was probably reduced to a soluble iodide, which dissolved the mercuric iodide. Another part of the iodine probably combined with some of the camphor and fatty matter. Although the activity of the iodine is very much diminished the mixture is decidedly active on account of the mercuric salt formed.

## 85.

“Creolin is said to be an emulsion of cresol, obtained by means of resin soap. Creolin forms a milky emulsion or mixture with water.” (U. S. Dispensatory, 1610.)

This prescription may be filled by dissolving the acid in the water and adding the creolin slowly with constant shaking. Part of the creolin separates on standing, but it may be readily mixed by agitation. As this is an eye-lotion and not clear, an attempt was made to filter it, but with the result of separating nearly all of the creolin. It should be dispensed with a “Shake well” label.

## 86.

The citric acid should be dissolved in the boiling water and then the magnesium carbonate added to this. Carbon dioxide is liberated and magnesium citrate goes into solution. The addition of borax does not cause any precipitation, although the solution is alkaline. If the borax is added to the solution of citric acid and then the magnesium carbonate a large amount of the last ingredient is not dissolved, the acid having been nearly neutralized by the borax.

## 87.

Gold and sodium chloride precipitates the sulphates of atropine and strychnine and the alkaloids in cinchona. There is about thirty per cent. of alcohol present but not enough to prevent precipitation. By dissolving the gold and sodium chloride in water and adding an equal weight of sodium thio-sulphate a compound is formed that does not precipitate the alkaloids from this mixture. The gold may be reduced on standing for some time. Water precipitates inert matter from the fluid extract. Atropine and strychnine are somewhat antagonistic in their physiological action.

## 88.

In medium-sized medicinal doses morphine and atropine are physiologically incompatible. But the minute dose of atropine in this prescription assists rather than diminishes the action of morphine by relieving the cardiac depression, indigestion, and constipation.

## 89.

The pharmacist should not use the excipient directed. Potassium permanganate is easily reduced by organic matter, which it in turn oxidizes. Some excipient must be chosen that will not reduce the permanganate. A mixture of equal

parts of petrolatum, paraffin, and kaolin makes a good one, or resin cerate with althea may be used.

**90.**

The oil of turpentine reacts with the acids, with the generation of much heat, and unless care be taken it will be ignited. The acids should be mixed and cooled and then added in small portions to the oil, cooling after each addition. The alcohol should be added last, after the mixture is cold, so as to avoid volatilization.

**91.**

On mixing the acid with the bicarbonate in the presence of water effervescence takes place, due to the liberation of carbon dioxide; a nearly colorless quite strongly alkaline solution results. If this is allowed to stand undisturbed for two or three days the lower part of the liquid will be of a light-brown color and the upper part of a dark brown, and finally it will become dark brown throughout. An aqueous solution of a salicylate turns dark when exposed to the air, probably on account of the formation of some oxidation products. This change takes place much more quickly when the solution is alkaline. If the physician had prescribed sodium salicylate instead of the salicylic acid and sodium bicarbonate he would have gotten the same physiological effect, made a better preparation pharmaceutically, and saved the pharmacist considerable time and work. The patient should be informed of the change of color that will take place.

**92.**

This can be filled by dissolving the alkaloidal salts in the syrup of lemon and tincture of iron, adding the water, and then the phosphoric acid last. The solution is clear and of a pale reddish color previous to the addition of the acid. After the addition of the acid the solution becomes colorless and

slightly turbid and in a few minutes a heavy precipitate is formed. The three disturbing causes are tincture of iron, phosphoric acid, and quinine sulphate, leaving out any one of which prevents precipitation. If the amount of quinine is reduced to three grams there is but little precipitation and none if it is reduced to two grams. The decoloration is due to the formation of ferric phosphate, which is insoluble in water but soluble when there is an excess of free acid.

### 93.

This was filled by dissolving the antikamnia in the elixir with the aid of heat; there was no separation at once. The quinine bisulphate was then added and an effervescence took place. A clear solution resulted, which on standing a short time deposited needle-shaped crystals. The solution is alkaline to litmus. Antikamnia is said to contain acetanilid, sodium bicarbonate, and caffeine. It is probably this bicarbonate that causes the effervescence with the bisulphate of quinine and at the same time sets free the alkaloid which is precipitated. Some acetanilid is also precipitated on standing.

### 94.

The first two ingredients when mixed give a greenish-brown solution, which when diluted with water gives a deep-blue color and largely diluted gives a violet color. On adding the sulphurous acid the color is destroyed within a few minutes. The ferric chloride is reduced to the ferrous chloride and sulphate, and a ferrous salt does not give a coloration with carbolic acid. If the sulphurous acid is added direct to the tincture of ferric chloride a deep-red solution of ferric sulphite is formed, which changes to ferrous sulphate and becomes colorless. Adding the carbolic acid to this gives no coloration. It makes little or no difference what order is observed in filling this prescription.

**95.**

Ferrous sulphate usually contains some ferric sulphate and this reacts with the calcium hypophosphite to form ferric hypophosphite and calcium sulphate, the former being only sparingly soluble, and the latter requiring 380 parts of water for solution. Part of the sulphuric acid of the Epsom salt will go to form calcium sulphate. In an acid solution the potassium chlorate would have an oxidizing effect on the ferrous sulphate and also on the hypophosphite; in this prescription it probably has but little chemical action. The solution of strychnine is a British preparation containing about one per cent. of strychnine hydrochloride. Potassium chlorate and a hypophosphite should not be triturated together dry, as they form an explosive mixture.

**96.**

This mixture makes a clear alkaline solution, colorless at first, but in a few minutes acquiring a light-brown color, which slowly becomes dark red-brown or almost black. This coloration is due partly to the alkaline salicylate acquiring a red color in the air, and partly to the effect of action of the spirit of nitrous ether upon the salicylate. Prof. Attfield suggests the formation of nitrosalicylic acid which is colored. The change does not take place quite as rapidly when the spirit is mixed with the carbonate previous to the dissolving of the sodium salt. Generally the spirit of nitrous ether is acid, and when ammonium carbonate is added to it carbon dioxide is given off.

**97.**

This was filled in several ways, the result being the same. The codeine was triturated with a little water and a half dram of dilute phosphoric acid added to dissolve the alkaloid. The hydrocyanic acid was next added, and then the tincture of iodine, which did not precipitate the alkaloid, but was itself

decolorized at once. The further addition of the water simply diluted the solution.

If the tincture of iodine is added to the solution of codeine in water and phosphoric acid a reddish-brown precipitate is formed, consisting of codeine and iodine. This precipitate is not dissolved by adding an excess of phosphoric acid or sulphuric acid, but the twenty minims of dilute hydrocyanic acid dissolves the precipitate and makes a clear colorless solution. The explanation is that the hydrocyanic acid reduces the iodine to an iodide and thus breaks up the compound of codeine and iodine. Other reducing agents, as sodium hyposulphite, have a similar effect.

### 98.

Reaction takes place between the calcium hydrate and the mercurous chloride, forming calcium chloride and the black mercurous oxide. This is similar to the "black wash" of the National Formulary.

### 99.

The best way to fill this prescription is to dissolve the corrosive sublimate in the glycerin mixed with a half dram of water. Then to this solution add *all at once* the syrup of lime. A yellow precipitate is formed at first, but this quickly disappears and a clear slightly yellowish liquid results. A slight light-gray precipitate is formed after standing a day, and this increases slowly for several days. Certain organic substances, such as glycerin, sugar, and gum arabic, have the power of preventing the precipitation of solutions of some of the metallic salts by alkali hydrates.

If the syrup of lime is added slowly to the solution of corrosive sublimate a yellow precipitate is formed, but is redissolved again when the water is added. Quite a heavy steel-gray precipitate forms within an hour and it slowly increases on further standing. A similar result takes place if the solution of mercuric chloride is added to the syrup of lime.

**100.**

Free bromine is formed if the potassium bromide is added to the tincture and the free bromine combines with antipyrin. If the bromide is dissolved in water and then added to the tincture of iron previously diluted with water no bromine is liberated. Antipyrin gives an intense red coloration with the tincture of iron.

**101.**

The compound tincture of iodine was official in the 1870 Pharmacopœia and contained iodine and potassium iodide dissolved in alcohol. Reaction takes place between the gold chloride and the potassium iodide. "Potassium iodide, added in small portions to a solution of auric chloride (so that the latter is constantly in excess where the two salts are in contact), and when equivalent proportions have been reached, gives a yellow precipitate of aurous iodide,  $\text{AuI}$ , insoluble in water, soluble in large excess of the reagent; the precipitate is accompanied with separation of free iodine, brown, which is quickly soluble in small excess of the reagent as a colored solution. But on gradually adding auric chloride to solution of potassic iodide, so that the latter is in excess at the point of chemical change, there is first a dark-green solution of potassio-auric iodide,  $\text{KIAuI}_3$ ; then a dark-green precipitate of auric iodide, very instable, decomposed in pure water," forming the yellow aurous iodide. (Prescott and Johnson's *Qualitative Chemical Analysis*, 4th ed., 154.) Probably the organic matter present also tends to the reduction and precipitation of the gold. The physician should be notified of the change which takes place. Only a very small amount of menthol is dissolved.

**102.**

The usual maximum dose of the fluid extract of digitalis is two minims, some authorities giving it as high as three.

In this prescription it is about three and a half minims. Taking into consideration the frequency of the dose and that digitalis is cumulative, the pharmacist should decline to fill it until he has consulted the prescriber.

**103.**

No apparent change takes place at first but in less than four hours a yellow-brown precipitate of metallic gold forms. The arsenous acid reduces the gold chloride. It is also easily reduced by many other inorganic compounds as well as by organic matter and light.

**104.**

Tincture of iron if not too strongly acid will give a color varying from a blue to a dirty green with morphine. This color is destroyed by excess of acid or by alcohol. This prescription will give a bluish-green mixture, which will turn to a yellowish orange in a day or two. This latter change is probably due partly to the slow formation of chlorine by the action of the hydrochloric acid in the tincture on the potassium chlorate. Chlorine turns a morphine solution orange color. There is not enough water to dissolve all of the chlorate.

**105.**

This gave a clear solution at first but needle-shaped crystals began to form within a half hour and by the end of an hour there was quite a heavy precipitate. By the next morning there was so much precipitate that an even dose could not be poured out. Using elixir instead of water does not entirely prevent precipitation and a larger percentage of alcohol is necessary.

**106.**

If the sulphate of iron is strictly ferrous, no liberation of iodine takes place when a solution of potassium iodide is



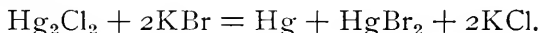
added to it, but most of it contains some ferric salt which liberates iodine. If the morphine is now added it will be precipitated by the iodine. The solution of ferrous sulphate gradually deposits a precipitate of subsulphate of iron. Or if the solution of ferrous sulphate and the morphine are mixed before adding the potassium iodide no free iodine is formed, the morphine seeming to reduce the ferric sulphate to ferrous.

**107.**

In massing these two chemicals together reaction takes place, with the liberation of carbon dioxide, which causes the mass to swell to several times its original size. This reaction goes on slowly, requiring several hours for completion, and the mass should not be made into pills until the reaction has been completed. Had the prescriber directed the subcarbonate of bismuth instead of the subnitrate he would have avoided this difficulty and gotten the same physiological effects.

**108.**

If the ingredients are powdered separately and are perfectly dry when mixed no chemical reaction takes place. The powder will keep for months if protected from moisture. On the addition of water the powder at once becomes dark gray in color. The darkening is due to the formation of metallic mercury; at the same time some mercuric salt is formed, which with the excess of potassium bromide forms a compound soluble in water. This is a dangerous prescription and should not be dispensed unless the dose is reduced. If the reaction takes place according to the equation given below, each powder will contain about three tenths of a grain of mercuric salt.

**109.**

Upon bringing together solutions of lead acetate and zinc sulphate, mutual decomposition takes place and lead sulphate

is precipitated. In a prescription for injection, like this, it is not customary to filter out the precipitate.

### 110.

This mixture gives a nearly black precipitate and a brown-black liquid. Several experiments were made to determine what agents caused the change. The hydrogen dioxide glycerin, and water showed no change on standing several days but when a mixture of these contained zinc sulphate it acquired a yellow to a yellow-brown color and became turbid after a day or two. A mixture of carbolic acid, hydrogen dioxide, and water showed no change after standing several days, but as soon as zinc sulphate was added a play of colors was noticed. There was first a green, then green-black, brown-black, red-brown, red-brown with a tinge of purple, finally brown-black, all within a space of a few minutes. In less than a half hour a precipitate had formed which increased on standing. On adding a solution of zinc sulphate to hydrogen dioxide water an effervescence took place and gas was formed slowly for several hours; a light precipitate settled. Hydrogen dioxide is said to oxidize carbolic acid to pyrocatechin and hydroquinone and to oxidize glycerin to glyceric, oxalic, and tartaric acids. Just what part the zinc sulphate played in this prescription was not determined. It perhaps acted only as a carrier or perhaps as a decomposer of the hydrogen dioxide.

### 111.

This mixture is permanent in a dry atmosphere, but in a damp one it absorbs moisture. Either in the presence of absorbed moisture or when taken into the stomach several reactions are liable to take place. Lead sulphate would be formed from the lead subacetate and morphine sulphate. The sodium bicarbonate would react with each of the other three ingredients, forming with bismuth subnitrate, bismuth subcarbonate and carbon dioxide; with lead subacetate, lead

carbonate; with morphine sulphate, the free alkaloid. Lead subacetate would also combine with the morphine to make a compound insoluble in water. These incompatibilities do not make a dangerous mixture, and there is no reason for declining to fill it.

### 112.

Triturating the iodol with the mercuric oxide caused an explosion, which might have been avoided by mixing the ingredients separately with portions of petrolatum and then mixing these.

### 113.

A mixture of these ingredients sometimes becomes soft and sticky in a short time and again it may remain in a powder for days. The condition of the atmosphere seems to cause the variation. "The reaction between sodium salicylate and antipyrin, thought to be due to chemical change, is simply due to deliquescence." (Nat. Dispensatory, 5th ed., 227.) This explanation is hardly satisfactory, since either chemical alone is not hygroscopic. By putting these ingredients into capsules separately without previous mixing they in time become soft and liquid, but not before the prescription would ordinarily be used. The capsules might be dispensed in a bottle.

### 114.

This was filled by dissolving the sodium bicarbonate, borax, salicylic and benzoic acids in water. The thymol and menthol were rubbed together until a liquid resulted; then the eucalyptol, the glycerin, and the oil of wintergreen were added. To this was added the first solution and an effervescence ensued. After allowing the mixture to stand an oily liquid separated, rising to the top. The effervescence is due to a reaction between the bicarbonate and the salicylic,

benzoic, and boric acids, the latter acid being formed by the action of glycerin on borax. (See No. 141.) Eucalyptol makes a clear mixture with glycerin, but is separated on the addition of water. The oily liquid formed by the menthol and thymol does not make a clear solution with glycerin, nor does the oil of wintergreen; and whatever of these may have been dissolved by the glycerin is thrown out of solution by the water. A "Shake" label is necessary.

### 115.

The quinine sulphate was dissolved in a part of the water with the aid of the acid. The potassium iodide was dissolved in the balance of the water and added to the quinine solution. Iodine is gradually formed by the acid acting on the iodide, and this combines with the quinine, forming a dark-brown precipitate.

### 116.

Basham's mixture contains acetic acid and an acetate. The quinine salt dissolves in this, but within a few minutes it is thrown down as a bulky crystalline quinine acetate. The mixture is so thick that it would be difficult to pour out an even dose.

### 117.

Borax is alkaline in reaction and precipitates the hydrastine as the free alkaloid, and also precipitates the alkaloids from the tincture of opium. The boric acid is not sufficient to neutralize the alkalinity of the borax. As the preparation is to be dropped into the eye, it should be filtered, and in so doing nearly all of the hydrastine is removed. The physician's attention should be called to this, and he be advised to increase the amount of acid or decrease the borax or, what is better, leave out the latter. Boric acid does not give a precipitate with a solution of hydrastine sulphate.

## 118.

When these ingredients were mixed a clear solution resulted, which was of a light-yellow color at first, but within five minutes became green. On allowing this to stand no change in color took place until the third or fourth day, when it acquired a greenish-brown color, and by the sixth day it had lost all green and was of a brownish-red color; further standing changed it to a deep red.

It has been proved that ethyl nitrite or amyl nitrite or any substance containing nitrous acid forms with antipyrin the green isonitroso-antipyrin, which crystallizes out of concentrated solutions. At one time it was thought that this green compound was poisonous, but it is not now generally considered so. [See ANTIPYRINUM, No. 17.]

## 119.

The quinine sulphate was dissolved in part of the water with the aid of the acid. When the solution of potassium iodide in the balance of the water was added to the quinine solution a precipitation occurred. This granular precipitate, which falls quickly, is potassium bitartrate, formed by the reaction between the potassium iodide and the tartaric acid. That it is not the quinine that is precipitated can be proved by substituting sodium iodide for potassium iodide, when no precipitation takes place. In concentrated solutions potassium iodide precipitates quinine. Hydriodic acid, formed by the action of tartaric acid on potassium iodide, is easily decomposed by the air, liberating iodine which precipitates the quinine. When this mixture is allowed to stand for two or three weeks without being disturbed two layers in the precipitate are noticed, the bottom one is white and is the potassium bitartrate, while the upper one is red-brown and is the iodine compound of quinine. The directions are: Mix. Label: Let a teaspoonful be taken two or three times a day.

**120.**

When the spirit of nitrous ether is added to the resorcin dissolved in the water and glycerin a dark-red solution is formed. This is perhaps due to the formation of dinitroso-resorcin (or possibly mononitroso-resorcin), which crystallizes in yellowish plates. Ammonia turns this solution a deep blue.

**121.**

When first mixed the solution is clear and colorless, but changes in a day or two to a blue. This on standing for two or three weeks becomes dark purple or violet-blue.

**122.**

These ingredients make a clear dark-red solution, which changes to a red-straw color within five minutes. The red color is due largely to the tincture of iodine. Iodine with ammonia in excess forms chiefly ammonium iodide with a little ammonium iodate, so that in this prescription, so far as physiological effect is concerned, it would be about as well to use some ammonium iodide instead of tincture of iodine. At the end of twenty-four hours the mixture was strongly alkaline and still slightly colored.

In a mixture of ammonia and iodine there is some danger of the violently explosive iodide of nitrogen being formed, more especially where the iodine is in excess. This iodide of nitrogen is insoluble and is slowly precipitated as a dark-brown solid.

**123.**

This prescription makes at first a clear solution, which gives a precipitate on standing for a few hours. If the tincture of iron is not strongly acid the precipitate is yellowish brown. The precipitate was filtered out and washed with water until the washings no longer gave a test for iron. It was

then dissolved in dilute sulphuric acid; the solution was not fluorescent nor bitter; on adding ammonia water it gave a heavy red-brown precipitate of ferric hydrate. From this it was supposed that the original precipitate was a basic salt of iron which had been thrown out of solution by the quinine taking some of the hydrochloric acid from the tincture to form a more soluble quinine salt.

If, however, some hydrochloric acid is added to the tincture before adding the alkaloidal salts the solution remains clear for some time, but finally deposits prismatic crystals. These crystals dissolve readily on addition of water, and are probably a quinine salt separated out from a supersaturated solution. The pharmacist in dispensing the prescription should see that the tincture is quite strongly acid. The physician should also give his consent to allow the solution to be diluted with water with an increase in the dose.

#### 124.

This solution is bluish red in color. No chemical reaction occurs except that the salicylic acid occurring as methyl salicylate in the oil of wintergreen combines with the iron to form a salicylate of iron, which gives the increase of color. By adding the water gradually to the iron a play of colors is noticed: first yellow, then red, dark red, and finally violet-red.

#### 125.

Salol and thymol triturated together make a liquid. When the other ingredients are added the mass is still much too soft to be made into pills. If a sufficient amount of liquorice root is added to make the mass of the required consistency the pills are too large to be taken easily. If the soap and extract of liquorice are omitted and in their place one dram of magnesia and one dram of kaolin are used a fair mass is made. Even then the pills are large and it is better to make twice the number of pills and double the dose.

**126.**

The spirit of nitrous ether acts on the morphine, giving a yellow color which becomes more of a brown on standing. Nitrous acid converts morphine into nitroso-morphine, pseudo-morphine, and another base (M. & M., III. 436). The directions are: Mix. Label: Take a teaspoonful as often as is required.

**127.**

Several reactions may occur when the first two ingredients are mixed, depending upon the proportions. A mercuric oxychloride is formed by the carbonate of potassium in the Fowler's solution. Under certain circumstances mercuric arsenite is formed and is dissolved in a solution of potassium arsenite. In the presence of an alkali, arsenites reduce mercuric compounds to mercurous compounds and then to metallic mercury, and the arsenites are oxidized to arsenates. In this prescription a pinkish-white precipitate is first formed, consisting of calomel and the coloring matter of Fowler's solution. On further standing it turns dark, due to the reduction to metallic mercury. Fowler's solution added to the quinine sulphate liberates the free alkaloid. If the prescriber had directed the solution of arsenous acid instead of potassium arsenite there would have been no reduction and but little precipitation.

**128.**

The ammonia water combines with the acid in the tincture of iron, forming ammonium chloride and ferric hydrate. The precipitation of the ferric hydrate may be prevented by mixing the glycerin with the tincture before adding the ammonia. If the ammonia is added to the tincture and then the glycerin the precipitated ferric hydrate dissolves but slowly in the glycerin. Glycerin, as well as sugar, acacia, honey, and some other organic substances, prevents or hinders the precipitation of many of the metals by alkali hydrates.



**129.**

Ferric salts gelatinize mucilage of acacia, and if the solution of dialyzed iron is added directly to the mucilage a solid mass results, which dissolves slowly in the syrup. By diluting the solution of iron with the syrup, and then adding this slowly to the mucilage with constant stirring, a thick homogeneous liquid may be obtained. [See ACACIA, Nos. 2 and 3.]

**130.**

“According to M. Mialhe, calomel is partly converted into corrosive sublimate and metallic mercury by ammonium chloride and by sodium and potassium chlorides, even at the temperature of the body.” (U. S. Dispensatory, 17th ed., 695.) This is not now generally considered a dangerous prescription. [See HYDRARGYRI CHLORIDUM MITE, No. 7.] The directions are: Mix and divide into 20 equal parts. Label: Take one two or three times a day.

**131.**

Spirit of nitrous ether with acetanilid gives a yellow solution, becoming red on standing for some time. The color occurs more quickly with an acid spirit than with a neutral one, and the presence of a little sodium bicarbonate prevents it for several weeks. Probably diazo-compounds are formed.

**132.**

Amyl nitrite and potassium iodide in the presence of an acid give free iodine, nitric oxide, and amyl alcohol. The prescription should not be dispensed as written. As from the directions—“Let it be dispensed quickly”—it seems to be an urgent case, and in all probability the effect of the amyl nitrite is what is wanted, the potassium iodide should be omitted. At the very first opportunity the physician should be informed of the omission.

**133.**

The first three ingredients were mixed and the Epsom salt dissolved in the water and the two solutions mixed. A turbidity occurred at once, due to the precipitation of extractive matter from the alcoholic liquids by the water. Within a few hours the magnesium sulphate had crystallized out so that its bulk was nearly one half of that of the mixture. Magnesium sulphate, being insoluble in alcohol, is thrown out of its aqueous solution by the alcohol of the fluid extracts and the tincture. This cannot be prevented except by diminishing the magnesium sulphate or increasing the proportion of water. If the mixture is made up to one pint with water the magnesium salt is not thrown out of solution.

**134.**

Iodine is soluble in 10 parts of alcohol and 60 parts of glycerin; nearly insoluble in water. The first two ingredients mix, making a clear solution, but water precipitates the iodine unless an old tincture of iodine which contains some hydriodic acid is used. By adding three or four grains of potassium iodide to the water the iodine remains in solution. Such an addition is admissible and should be made.

**135.**

The solution of bismuth (National Formulary) contains bismuth and ammonium citrate dissolved in water and ammonia water. Wine of pepsin (N. F.) contains hydrochloric acid. If the acid in the wine is in excess of the ammonia bismuth citrate will be precipitated. If the ammonia is in excess of the acid the pepsin is rendered inert. Some extractive matter in the tincture will be precipitated by the water. In filling this prescription the ingredients should be made as nearly neutral to litmus paper as possible before mixing.

**136.**

When calomel and cocaine hydrochloride are triturated together a gray mixture results. Probably a part of the calomel is reduced to metallic mercury, which gives the gray color, and another part is oxidized to mercuric chloride. As the amount in each pill of the mercuric chloride formed is within the limits of the dose of that substance, the pills may be dispensed. It would be well, however, to inquire the age of the patient and the frequency of the dose. By the addition of about five grains of starch or liquorice root and a little water a suitable pill-mass can be made, the pepsin giving sufficient adhesive qualities.

**137.**

This is a very common combination. Lead subacetate forms compounds with nearly all alkaloids, and these are insoluble in water. The opium alkaloids are no exceptions. The alcohol undoubtedly tends to prevent the precipitation to some extent, though there is still quite a heavy one. The lead is also precipitated by the meconic and sulphuric acids in the opium. The precipitate should not be filtered out but the mixture should be dispensed with a "Shake well" label.

**138.**

The usual dose of the fluid extract of digitalis is 0.01 to 0.12 Cc. In this prescription it is about 0.24 Cc., which is so largely in excess of the usual dose that the pharmacist should satisfy himself that the physician has made no mistake. The water gives a precipitate with the fluid extracts. If the spirit of nitrous ether is mixed directly with the fluid extracts it reacts with the tannin, giving off fumes of nitric oxide.

**139.**

When silver oxide and creosote are triturated together there is great danger of an explosion. It has been proposed

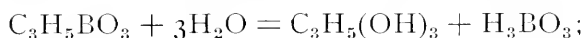
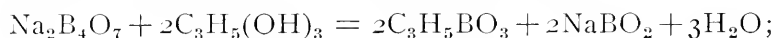
to mix the creosote with powdered soap and then with the oxide, which has been previously mixed with liquorice root. The mass should not be rubbed hard and should be kept cool.

#### 140.

The tannic acid in the tincture combines with the quinine to make the insoluble nearly tasteless quinine tannate. The water precipitates the resinous matter from the tincture. A "Shake well" label should be put on the bottle.

#### 141.

In filling this prescription there will be an effervescence, due to the generation of carbon dioxide. It is not caused by the carbolic acid and sodium bicarbonate, as might be supposed. Glycerin in the presence of water decomposes borax, forming sodium metaborate and boroglycerol. Water reacts with the boroglycerol to give glycerin and boric acid. The boric acid with sodium bicarbonate gives sodium borate and carbon dioxide. Other polyhydric alcohols, such as mannitol, dextrose, levulose, and glucose, act like glycerin in decomposing borax. The chemical reactions which take place may be represented by the following equations:



#### 142.

Carbon dioxide will be generated by the sulphuric acid and the potassium bicarbonate. There is a sufficient amount of the bicarbonate to neutralize all of the acid and also to liberate quinine as free alkaloid, which is nearly insoluble. It will also liberate ammonia from the ammonium carbonate in the aromatic spirit of ammonia used as the menstruum in making the tincture. Resinous matter and the oils in the

tincture are thrown out of solution by the water. Tincture of guaiac if freshly prepared colors acacia blue.

**143.**

Spirit of turpentine is another name for oil of turpentine. Oil of turpentine is easily oxidized and nitrohydrochloric acid is a strong oxidizing agent, so that there is quite a violent reaction when the two are brought together. Even though the oil is emulsified first, chemical change cannot be avoided. Supposing that the prescriber wanted a four-ounce mixture, the dose of the acid would be about thirteen minims. The maximum dose, as given in the U. S. Dispensatory, is six drops. The excessive dose would be sufficient to prohibit the filling of this prescription. In such a case where the prescriber could not be notified many pharmacists would use the dilute nitrohydrochloric acid instead of the concentrated.

**144.**

The potassium permanganate was dissolved in part of the water and the glycerin was diluted with the balance of the water; the two solutions were then mixed. Within two minutes the mixture was of a brownish-black color and almost solidified by the manganese dioxide that was formed. After standing the precipitated manganese dioxide settled, leaving a clear colorless solution, showing that the permanganate was all reduced. When potassium permanganate and concentrated glycerin are brought together there is some liability of the mixture exploding or inflaming. The oxidation products of the glycerin are probably formic, propionic, and tartronic acids; in an alkaline mixture oxalic and carbonic acids are formed.

**145.**

The potassium citrate was dissolved in the syrup and the spirit was then added. The two liquids were mixed, produc-

ing a turbidity, and on standing separated into two distinct layers. Potassium citrate is hygroscopic, but nearly insoluble in alcohol. The alcohol of the spirit has a tendency to throw the citrate out of solution, but the salt has such an affinity for water that it carries some water with it, forming a solution not miscible with alcohol.

#### 146.

The aromatic spirit of ammonia contains ammonium hydrate and ammonium carbonate, and these act similarly in precipitating the corrosive sublimate as ammoniated mercury ( $\text{NH}_2\text{HgCl}$ ). Ammoniated mercury is soluble in solutions of ammonium salts and somewhat soluble in acids, so that the sulphuric acid in the infusion will redissolve it, though not very readily. The precipitation may be prevented by mixing the infusion and spirit together first. Mercuric chloride precipitates the cinchona alkaloids from their aqueous solutions when not too dilute. The oils in the spirit are thrown out of solution by the water of the infusion. The directions are: Mix. Label: Teaspoonful twice a day.

#### 147.

Triturating the alum with the lead acetate produces a moist sticky mass. This is due to the chemical reaction which takes place, forming lead sulphate, aluminum sulphate, potassium acetate, and liberating the water of crystallization which makes the mixture sticky. A mass is obtained when zinc sulphate and lead acetate are rubbed together. In either case the odor of acetic acid is noticeable. When the mixture is put into water the tannic acid will precipitate the lead, if any remains not combined with sulphuric acid, as lead tannate. The other two salts are not so readily precipitated as tannates. In filling this prescription the water of crystallization may be removed by heating, or the ingredients may be powdered separately and then mixed lightly, and no difficulty will ensue.

**148.**

The difficulty with this prescription is that triturating the salicylic acid with the exalgin produces a soft sticky mass which is unfit for dispensing in powders. Even by mixing all of the other ingredients except the acid and adding it last and then mixing lightly on paper the mixture becomes sticky. By diluting the acid with twice its weight of powdered althea and then with the other ingredients a fair powder can be obtained. Probably the best way would be to put the ingredients into capsules, separating the acid from the exalgin by the phenacetin and cocaine, if the mixture is to be used internally.

**149.**

This makes a mixture which is very thick at first, but yet can be poured. Allow it to stand for half an hour and it solidifies; by the end of twelve hours it is so firm that it cannot be shaken in the bottle. Even if only one half of the amount of magnesia is used the mixture will solidify so that it cannot be shaken up if allowed to stand undisturbed for a day or two. By vigorous shaking several times the mass can be broken up so that it can be poured. Magnesium oxide takes up water to form the gelatinous magnesium hydrate. The alkalies all tend to prevent the precipitation of the resinous matter in the tincture by the water.

**150.**

Several chemical reactions will take place, depending upon the order of mixing. The possible reactions are as follows: 1. Ferric iron is reduced to ferrous iron, giving at first a red solution of ferric sulphite. 2. The hydrochloric acid of the tincture reacts with the hyposulphite, forming sodium chloride, sulphurous acid, and sulphur. 3. With potassium chlorate, the sulphurous acid thus formed gives potassium sulphate, hydrochloric and sulphuric acids. 4. Hydrochloric

acid with potassium chlorate gives potassium chloride, water, chlorine, and several oxides of chlorine. 5. The chlorine thus formed oxidizes the reduced ferric salt back to the ferric condition and oxidizes the hyposulphite to a sulphate.

There is not enough water to dissolve all of the chlorate, and after the reactions have taken place there is not enough acid to form a normal ferric salt of all of the iron; a part of it remains as an insoluble oxychloride.

### 151.

When phenacetin and quinine sulphate are triturated together no change is noticed, but on adding hydrobromic acid the mixture acquires a yellowish-green color. What reaction occurs has not been determined. Phenacetin and hydrobromic acid give a white mixture; quinine sulphate and hydrobromic acid give only a very slight greenish color. Another incompatibility is between the hydrobromic acid and the calomel; a part of the mercurous chloride is reduced to metallic mercury, and a part is oxidized to mercuric chloride, which is much more active than calomel. By adding the calomel last the reaction can be prevented to some extent, but it may even then be considered as a rather dangerous mixture. The directions are: Mix and divide into 10 equal parts and put into gelatin capsules. Label: One capsule to be taken every three hours.

### 152.

Commercial dilute hydrocyanic acid usually contains some free sulphuric or hydrochloric acid, which has been added to preserve the hydrocyanic acid. If one of these mineral acids is present an effervescence will take place. Hydrocyanic acid itself does not decompose carbonates (Prescott and Johnson's *Qualitative Chemical Analysis*, 4th ed., 308). Hydrocyanic acid easily decomposes in water, but in an alkaline solution its decomposition is much quicker, giving



a formate and a dark-colored precipitate containing paracyanogen.

### 153.

Triturating salol and monobromated camphor together produces a liquid. But if the acetanilid and salol are rubbed together first and then the camphor added a damp powder is obtained. If about fifteen grains of powdered soap are then added and a little drying powder if necessary, a mass can be made, the pills becoming hard in an hour or two.

### 154.

The order of mixing these ingredients makes a difference in the products first formed, but after standing the results are probably similar. If the solution of zinc chloride and the lime water are mixed a white precipitate of zinc hydrate is formed, and there is no change in appearance on adding the mercuric chloride dissolved in the water.

If, however, the mercuric chloride solution is added to the lime water the yellow oxide of mercury (yellow wash) is precipitated. On adding the zinc chloride solution and allowing it to stand the precipitate is changed within two hours from a dense yellow to a flocculent white precipitate.

If the lime water is added to the solution of mercuric chloride a red-brown precipitate of oxychloride of mercury is formed, and this is replaced by a white precipitate when the zinc chloride is added.

That the lime water precipitates nearly all of the mercuric chloride when these two chemicals are brought together in the above proportions is evidenced by taking some of the clear supernatant liquid and passing hydrogen sulphide gas through it and getting little or no black precipitate of mercuric sulphide. If some of the clear solution is taken after the zinc chloride has been added and the yellow precipitate turned white, and this solution is treated with hydrogen sulphide, a heavy black precipitate of mercuric sulphide is pro-

duced, showing that the mercuric oxide has been dissolved and the zinc precipitated. Owing to the fact that the mercury is in solution, this prescription might be considered dangerous for application, since if all of the mercury is redissolved it will be in the proportion of about 1 to 500.

### 155.

Piperazin is strongly alkaline and when added to an aqueous solution of phenocoll hydrochloride precipitates the insoluble base phenocoll. Under certain circumstances, as when the phenocoll hydrochloride is from fifty to one hundred per cent. in excess of the piperazin, a clear solution is said to be obtained. This prescription was filled by dissolving the phenocoll hydrochloride in the elixir, syrup, and peppermint water, and the piperazin in the water. The two solutions were mixed, making a clear solution, which remained clear for two days. It then happened to be chilled at night and crystallization took place, making an almost solid mass, which remained so even at the ordinary temperature. On warming a solution resulted, which remained clear at the ordinary temperature, but again solidified on being chilled.

### 156.

The ammoniated tincture of guaiac if it has not been exposed too long to light and air gives a blue color with the tincture of iron, but an old tincture of guaiac gives a brown-black. The tincture of aloes gives a green-brown to a black-brown with the iron. There is not enough of ammonia in the ammoniated tincture of guaiac to form the ferric hydrate unless the tincture of guaiac is freshly made with a fresh aromatic spirit of ammonia and the tincture of iron is free from excess of acid. Even then the syrup will tend to keep the ferric hydrate in solution. The syrup precipitates the resinous matter from both tinctures. The resulting mixture is nearly black and very turbid.

**157.**

The dose of the morphine sulphate is considerably in excess of the amount usually given. The prescriber shows his knowledge and appreciation of this fact by putting three exclamation-points after the ingredient. The prescription should be filled as written. Some physicians when wishing to give unusual doses underscore the ingredient and the quantity. The latter is perhaps a better method, as there is less danger of a mistake. The directions are: Mix. Dispense in 10 capsules. Label: Let one be taken during the night.

**158.**

On mixing these ingredients a blue-black solution is obtained. This is due to the presence of some ferric sulphate. Ferrous sulphate as found in drug-stores nearly always contains some ferric sulphate. If strictly ferrous sulphate is used tannic acid gives no coloration with it.

This prescription was filled by dissolving the clear crystals of ferrous sulphate in water, adding four grains of sodium thiosulphate and two drops of sulphuric acid, and boiling until all of the ferric iron was reduced to the ferrous, as shown by adding a drop of this solution to a solution of potassium sulphocyanide and getting no red color. The tannic acid was dissolved in another portion of water, the syrup added, and this added to the iron solution. A colorless liquid was obtained, astringent but not inky in taste. In three days the solution had assumed a green color and in ten days it was blue-black. This change, caused by the oxidation of the iron by the air, would have taken place sooner if the bottle had been opened frequently.

**159.**

This prescription can be filled in one of two ways. The chloral hydrate may be dissolved in the water, and the camphor powdered and mixed with the syrup and then with the

solution of chloral. The camphor will rise to the top. Or the camphor may be triturated with the chloral hydrate until liquefied, and this shaken with the syrup and water. The oily chloral-camphor does not dissolve in the water, but seems to be decomposed by it, the chloral going into solution and the camphor coming to the top as a soft white solid. There seems to be no difference in the final result as to which method of filling is used. In either case the mixture is a difficult one to pour so as to get an even dose of the camphor. A more elegant preparation would be made by dissolving the camphor in a little expressed oil of almonds and then emulsifying it with acacia.

### 160.

On adding the phosphoric acid to a solution of the iron and quinine citrate a white precipitate forms which gives tests for iron but not for quinine. It is probably iron phosphate and is soluble in a considerable excess of the acid. When the dilute phosphoric acid is further diluted with water and then added to the iron salt dissolved in the balance of the water with the syrup, little or no precipitation takes place. When the tincture is added to this, a turbidity results and the mixture becomes darkened, due to the precipitation of matter from the tincture and the formation of tannate of iron.

### 161.

In lightly mixing the first two ingredients when powdered and perfectly dry no change in color is noticed; triturated together with considerable pressure, the powder turns gray. As soon as moisture comes in contact with the mixed powders they become dark gray—the coloration is due to the formation of metallic mercury—while at the same time a part of the calomel is changed to mercuric chloride and mercuric cyanide. The prescription should not be dispensed. (See No. 192.) A translation of the latter part of the prescription

is: Tragacanth, water, of each a quantity sufficient to make a mass which is to be formed into 30 pills. Label: Take two pills every night.

**162.**

Soluble metallic salts frequently throw the volatile ingredient of medicated or aromatic waters out of solution. In this case there will be a separation of camphor, which will rise and float on top. The amount is so small that it may be disregarded or filtered out.

**163.**

The Rochelle salt throws some of the camphor out of solution. Then on the addition of the aromatic sulphuric acid the turbidity is increased on account of the separation of the oil of cinnamon and the resin of ginger. Chemical reaction takes place between the Rochelle salt and the sulphuric acid, the sodium sulphate going into solution and potassium bitartrate being precipitated.

**164.**

Fowler's solution is alkaline in reaction and has a tendency to precipitate the alkaloids from the fluid extract, but this is prevented by the alcohol in the elixir. The Fowler's solution contains some carbonate and bicarbonate of potassium, which are said to be incompatible with antipyrin. Ammonium iodide generally contains a little free iodine, and iodine combines with antipyrin. Practically, however, this prescription can be filled without difficulty or danger.

**165.**

Strychnine (free alkaloid) is soluble in 6700 parts of water. There is enough of water and alcohol in the elixir to prevent the aromatic spirit of ammonia from throwing it out of solution. The ammonia will not precipitate the alkaloids of the

elixir of cinchona. The above mixture will not be clear, however, because the oils in the aromatic spirit will be separated by the elixir. If the spirit of ammonia were used instead of the aromatic spirit a clear dark-red solution would be obtained. This substitution would not be allowable without the prescriber's consent.

**166.**

All of the ingredients except the syrup can be mixed without producing much turbidity. But on adding the syrup to this mixture the resinous matter from the fluid extract and tincture is precipitated, and the copaiba, oil of turpentine, and camphor are separated. To make a presentable mixture some emulsifying agent must be used.

**167.**

"On adding carbolic acid to albumin or to collodion coagulation takes place (difference from creosote)." (U. S. P., 9.) This mixture makes a solid mass and cannot be applied with a brush. A gelatinous mass which possibly might be applied with a brush is obtained when one half of the collodion is replaced by alcohol.

**168.**

If the Fowler's solution is added to the tincture of nuxvomica the alkali in the solution will liberate the free alkaloid strychnine, but it will be held in solution by the alcohol until the infusion is added. With the addition of most infusions the alkaloids would be precipitated, but the infusion of cinchona contains sulphuric acid, which combines with the alkaloids, forming a soluble salt. The water of the infusion will precipitate some of the inert matter from the tincture.

**169.**

When solution of lead subacetate is added to mucilage of acacia a solid gelatinous mass is formed. In this prescrip-

tion if both are diluted with the water and mixed with constant stirring the acacia is precipitated in small masses. Neutral lead acetate does not gelatinize mucilage of acacia.

### 170.

The silver nitrate is entirely precipitated by the sodium chloride as silver chloride. It is customary to filter eye-washes, and if this one is filtered there will be only a very weak solution of sodium chloride and sodium nitrate left. There is no admissible method by which the precipitation can be prevented without changing the prescription.

### 171.

If concentrated solutions of the first two ingredients are mixed a reddish-brown salicylate of iron is precipitated. The citric acid in the syrup of lemon precipitates salicylic acid from a concentrated solution of lithium salicylate. By dissolving the iron salt in a part of the water and adding the syrup, then dissolving the salicylate in the balance of the water and mixing the solutions, a clear deep-red solution can be obtained. The deep-red color is due to the ferric salicylate formed.

### 172.

The calcium hypophosphite slowly reduces the mercuric chloride to mercurous chloride and finally to metallic mercury. This precipitation is not readily seen in the syrup of sarsaparilla, but if water is used instead of the syrup a turbidity is noticed as soon as solutions of the salts are brought together. The syrup of sarsaparilla also has a tendency to reduce the corrosive sublimate, but only very slowly.

### 173.

The maximum dose of santonin, as given by most authorities, is four grains, some giving as high as five grains. Hav-

ing two maximum doses coming so close together renders this prescription a dangerous one. Prescriptions containing santonin should be protected from the light, as light causes a change in color from white to yellow, probably with the formation of new compounds. Inquiry should be made to determine whether it is for a child or an adult and if for the former the prescription should not be filled, as two grains are said to have killed a child.

#### 174.

This mixture is far from being a solution. The benzoïn and the Tolu are only partially soluble in alcohol and the acacia is insoluble. The insoluble matter quickly settles to the bottom of the mixture, forming a layer nearly equal in depth to that of the supernatant liquid. It, however may be readily diffused through the liquid by agitation. A "Shake well" label is necessary.

#### 175.

A clear solution is formed at first, but in about a half hour needle-shaped crystals begin to fall. The precipitate increases for several hours and contains strychnine which is thrown out of solution with the iodide. Much commercial potassium iodide contains a carbonate, but in this case an iodide free from carbonate was used. It has been suggested to use acacia to suspend the precipitate, but this is objectionable because the mixture liberates iodine on standing a few days and iodine further precipitates strychnine. Mucilage of acacia is acid and probably sets free some hydriodic acid which is oxidized by the air.

#### 176.

Borax is alkaline in reaction and precipitates nearly all alkaloids from solutions of their salts. It precipitates the cocaine in this prescription, but the difficulty can be pre-



vented by the use of a little glycerin. The glycerin acts chemically on the borax, breaking it up and forming sodium metaborate and boric acid. (See No. 141.) If boric acid were used instead of borax no precipitation would occur.

### 177.

Both the ammonium carbonate and the ammonium hydrate precipitate the mercuric chloride as nitrogen dihydrogen mercuric chloride, known in commerce as "ammoniated mercury" or "white precipitate." The precipitate settles quickly, but does not leave a clear fluid. The water of the mercuric chloride solution throws the oils of the aromatic spirit out of solution, making a white milky mixture.

### 178.

When the sodium salicylate dissolved in a little water is added to the quinine sulphate dissolved in the balance of the water with the aid of the hydrobromic acid, a curdy sticky precipitate is formed that cannot be mixed with the liquid. Two chemical reactions take place. Sodium salicylate with quinine sulphate forms sodium sulphate and the nearly insoluble quinine salicylate. Hydrobromic acid with sodium salicylate forms sodium bromide and the nearly insoluble salicylic acid. Permission to use alcohol or some other solvent should be obtained.

### 179.

On mixing solutions of the first two ingredients a reaction takes place, with the formation of free iodine and a reddish-brown precipitate. The aqueous solution of iron and quinine citrate is acid, and ferric salts in acid solutions with potassium iodide are reduced to ferrous compounds, iodine being liberated. Iodine in an aqueous solution of potassium iodide is a general alkaloidal reagent and precipitates the

quinine. Neutralizing the solution will prevent liberation of iodine for a time.

### 180.

This prescription is frequently given as an example of the incompatibility of bromides with strychnine salts. It is said that crystals of strychnine bromide will form after the mixture has been standing for a half hour. The writer failed repeatedly to get a precipitate even on making the solution twice as strong as that called for and also varying the proportions. The precipitation is partially explained by some writers by saying that the strychnine bromide is soluble in water, but insoluble in a solution of potassium bromide. In many instances the commercial potassium bromide is alkaline, due to the presence of a carbonate which has been left in to aid the preservation of the bromide. The carbonate precipitates the strychnine as the free alkaloid.

### 181.

Although the Fowler's solution is alkaline, there is enough of acid in the prescription to prevent any precipitation by it. The insoluble ferric phosphate is thrown down. By using the tincture of citro-chloride of iron no precipitation results at once but does after a day or two. If it were admissible to use twice as much phosphoric acid as tincture of iron there would be no precipitation.

### 182.

The National Dispensatory (5th ed., 826) says of calomel: "Boiling hydrochloric acid dissolves mercuric chloride and leaves mercury; in the diluted state and heated in contact with air mercuric chloride is slowly dissolved without separation of mercury." And again: "According to Jolly's observations, corrosive sublimate is also formed from calomel in the presence of hydrochloric acid."

It is a somewhat disputed question whether in such a prescription there would be any mercuric chloride formed, and if so whether the amount formed would be sufficient to have any disagreeable physiological effect. If the prescription is to be used up in a short time probably no bad results would follow. [See HYDRARGYRI CHLORIDUM MITE, No. 7.]

**183.**

Terpin hydrate dissolves in about 250 parts of water and iodol in about 5000 parts of water. These should be finely powdered before mixing with the other ingredients, and the prescription dispensed with a "Shake well" label. The glycerin and syrup are sufficiently viscid to keep the insoluble substances in suspension for a time.

**184.**

Each ingredient should be powdered separately and then mixed lightly with the other. If the two are rubbed together with some force slight crackling explosions take place. A sharp blow would probably cause serious results. The patient should be cautioned. With a little care on the part of the pharmacist and patient no ill results will follow from this combination.

**185.**

In this mixture the menthol floats on top and the boric acid goes to the bottom. Using alcohol, glycerin, or a fixed oil instead of water will not make a clear solution. The attention of the physician should be called to this prescription.

**186.**

Santonin is soluble in about 40 parts of alcohol, nearly insoluble in water, and not readily soluble in turpentine. The amount prescribed is not all soluble in the mixture. The

turpentine does not mix, but floats on top. Extractive matter from the fluid extracts is precipitated. The santolin should be in the form of a fine powder and the mixture made into an emulsion.

### 187.

The potassium carbonate is deliquescent. It should be powdered with some absorbent powder, such as althea, and then the arsenic, previously triturated with some sugar of milk, added. Next add the mass of iron and if necessary a little water. The pills should be dispensed in a bottle protected from the atmosphere; otherwise they will become soft.

### 188.

This solution has a much larger proportion of active ingredients than is usually prescribed in an eye-wash. Probably the prescriber meant grains instead of drams. It should not be dispensed without consulting the physician, as it would probably cause intense irritation. In case the prescriber cannot be reached and it seems urgent that the prescription should be filled the quantities can be reduced to grains and the prescriber notified at the earliest opportunity.

### 189.

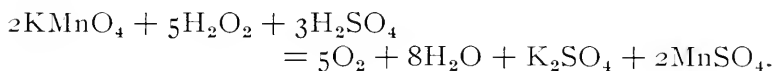
Mixing a solution of silver nitrate with a solution of cocaine hydrochloride produces a white precipitate of silver chloride. If this is filtered out about one half of the silver is removed. The pharmacist should use cocaine nitrate. If he does not have it he can make it by dissolving the one grain of cocaine hydrochloride in a little water and adding one half a grain of silver nitrate in a little water. This makes cocaine nitrate and silver chloride. The precipitate can then be filtered out and the requisite amount of silver nitrate added.

## 190.

Borax is soluble in 16 parts of water, and in this case there is not enough to dissolve it. Boric acid requires 25.6 parts of water to dissolve it, but it is much more soluble in a solution of borax. The principal difficulty with this prescription is that the mucilage of acacia is gelatinized by the borax, making a stiff mass. Boric acid has not the effect of gelatinizing acacia, and borax is prevented from doing so by the presence of sugar. Glycerin also prevents this action by decomposing the borax.

## 191.

The first two ingredients are both disinfectants and oxidizing agents, yet they react on each other, with the reduction of both. The chemical reaction is represented by the following equation:



The sulphuric acid necessary for the reaction is present in the hydrogen dioxide water, as a small amount is allowed to remain for preservation of the dioxide. The amount of hydrogen dioxide which 20 grains of potassium permanganate would act upon is 10.7 grains. If the dioxide water is official 1 fluid ounce contains about 13.7 grains of hydrogen dioxide, which would be sufficient to reduce all of the permanganate and decolorize the solution. The directions are: Let them be mixed by vigorous shaking. Label: Let it be applied to the affected parts night and morning.

## 192.

The cherry-laurel water of the Br. P. contains 0.1 per cent. of hydrocyanic acid. It has been proved that calomel with hydrocyanic acid is changed to mercuric chloride, mercuric cyanide, and metallic mercury. Hydrocyanic acid displaces

hydrochloric acid in dilute solutions, while in concentrated solutions hydrochloric acid displaces hydrocyanic acid. There is such a small amount of hydrocyanic acid that there would not be much of the mercuric salts formed.

### 193.

A mixture of thymol, alcohol, and ammonia is colorless at first, but acquires a decided though not deep green color on standing for a week. If the chlorinated soda solution is added to a mixture of thymol, alcohol, and ammonia a light-green clear solution is formed at once. Within ten minutes this becomes slightly turbid and of a deep-green color. On allowing it to stand a day an oily fluid separates from the dark-green solution in little round globules. These globules are black in appearance, but when broken up into very small ones they are blue-red or purple in color. This oily liquid has nearly the same specific gravity as the aqueous liquid.

### 194.

When the cocaine is mixed with the solution of silver nitrate it gives a black precipitate of silver oxide. If the cocaine is first dissolved in water with the aid of a little dilute nitric acid, which converts the alkaloid into a salt, the solution can be mixed with the silver nitrate without any precipitation. A better method of filling would be to use the cocaine hydrochloride and follow the directions under No. 189.

### 195.

This mixture gives at first a clear solution, but within a few minutes it begins to grow turbid from the production of a light-brown precipitate, which quite rapidly increases and becomes dark brown. This precipitation is due chiefly to the action of the eugenol in the pimenta on the tincture of iron. This is somewhat characteristic of all phenols, and

the color varies with the dilution. If the tincture of iron is not so very acid the quinine may precipitate some of the iron.

### 196.

The quinine sulphate dissolves in the water and citric acid, making a clear solution that does not precipitate on standing. On adding the potassium citrate, crystals begin to separate at once. Adding more citric acid will dissolve the precipitate and the addition of another portion of potassium citrate causes a precipitation again. It is said that quinine acid citrate is formed. Whatever the precipitate is, it is probably thrown out of solution by making a concentrated solution of potassium citrate, although this does not entirely explain the result since acid clears up the mixture again. The directions are: Mix. Label: A dessertspoonful after meals.

### 197.

In the presence of moisture this mixture becomes black. The pilocarpine hydrochloride probably breaks up the calomel, forming mercuric chloride which combines with the alkaloidal salt, and metallic mercury which gives the mixture its dark color. Several of the alkaloids have that property. The directions translated into English are: Mix. Send 8 such powders. Label: Of these powders take one night and morning.

### 198.

There is considerable danger in mixing these ingredients and the directions to "mix cautiously" should be followed. The potassium bichromate was powdered and mixed with the tar. To this the sulphuric acid was added with constant stirring. Heat and acrid fumes were generated. The mixture was a black, soft, granular mass, which after standing a day was scarcely acid to litmus paper. It probably had but little caustic effect.

## 199.

Sometimes the lime liniment causes a darkening when mixed with citrine ointment. In making the citrine ointment, if the nitric acid be insufficient in amount or the temperature rise too high, the oxidation of the fatty matter is effected in part at the expense of the mercuric nitrate, forming a mercurous nitrate. The calcium hydrate in the lime liniment acts on the mercurous salt, forming the black mercurous oxide. A translation of the directions is: "Make an ointment, to be used as directed."

## 200.

The usual dose of the fluid extract of gelsemium is from two to three minims. In the above prescription it would be about twice this. When chloral hydrate and antipyrin are brought together in concentrated solutions in the right proportions an oily liquid separates and upon standing forms crystals of monochloral antipyrin, commonly known as hypnal. In this case there is more than enough of chloral for the antipyrin, the proper proportions being 47 Gm. of chloral to 53 Gm. of antipyrin. Possibly there may be some dichloral antipyrin formed in this prescription. At least there is a separation of an oily liquid that does not solidify. The resinous matter in the fluid extracts is precipitated by the water. The prescription should not be dispensed without consulting the prescriber.

## 201.

Ferric acetate is formed in this prescription and it gives a very deep red color to the solution. If the ingredients answer the pharmacopœial requirements there will be no incompatibility. However, the solution of ammonium acetate is sometimes quite strongly alkaline, due to excess of ammonium carbonate or deficiency of acetic acid used; and if the tincture of iron is free from an excess of acid the alkali



causes the formation of ferric hydrate which will be kept in solution by the syrup.

### 202.

As this prescription is written it would make a dangerous mixture. The solution of potassium arsenite, being alkaline, slowly precipitates the strychnine. If the solution of arsenous acid were directed instead of Fowler's solution there would be no danger and the physiological effect would be the same.

### 203.

When the first two ingredients are rubbed together in a mortar chemical reaction takes place with enough violence to amount almost to an explosion, and there is an evolution of a large volume of white fumes. If the two chemicals are powdered separately and then mixed together lightly the change is slower and the mixture gradually turns brown. If mixed with separate portions of the cerate and then these mixed the reaction is retarded, but the ointment ultimately becomes brown. Chloral hydrate and potassium cyanide form dichloro-acetic acid, and in concentrated solutions form a crystalline compound which is not very soluble in water (M. & M., II. 4).

### 204.

The quinine sulphate would not be entirely soluble even though there were no tannic acid in the infusion. The tannic acid converts the quinine sulphate into the less soluble quinine tannate. The oil in the spirit of rosemary is thrown out of solution, as well as some of the inert matter in the tincture. This is a poor combination, even for an external preparation.

### 205.

By triturating the zinc oxide and carbonate with the petrolatum, and then adding the lime water gradually, a

partial emulsion can be effected. By the addition of thirty grains of acacia an emulsion can be made, which soon separates into three layers, the bottom consisting of the zinc salts, the middle chiefly of water, and the top of the emulsified petrolatum. These are readily mixed on agitation. Petrolatum is not saponified or otherwise chemically acted upon by calcium hydrate or other hydrates, as are the organic fixed oils and fatty substances. The best way to fill this prescription is to replace one fourth of the petrolatum with lanolin, mix these with thirty grains of acacia and emulsify with about a dram of the lime water, then add the balance of the water and lastly the zinc oxide and carbonate.

### 206.

Salicylic acid is soluble in 450 parts of water and 60 parts of glycerin; consequently a solution cannot be made unless something else be added. "With half its weight of borax and two and a half times its weight of glycerin a twenty-five per cent. solution of salicylic acid may be obtained." (Nat. Dispensatory, 5th ed., 89.) This prescription with thirty grains of borax would make a clear solution. But the addition of borax, potassium nitrate, ammonium citrate, or sodium phosphate should not be made without the knowledge of the prescriber. In the absence of the physician this should be dispensed as a "Shake" mixture.

### 207.

By mixing these ingredients a bright-red precipitate is formed in a few minutes and the iodine color of the liquid is nearly destroyed. In the course of a day or two there is no free iodine present. Probably three chemical reactions take place. The mercurous chloride and potassium iodide in the tincture form potassium mercuric iodide, potassium chloride, and metallic mercury. The metallic mercury with the iodine forms mercurous iodide, and this with more iodine makes

the red mercuric iodide. The final products depend to some extent upon the proportion of the tincture to the calomel.

### 208.

The trouble with this prescription is to get into and to keep in solution the two alkaloidal salts. Cocaine hydrochloride is soluble in .48 parts of water, 3.5 parts of alcohol, 2800 parts of ether, or 17 parts of chloroform. Morphine sulphate is soluble in 21 parts of water, 702 parts of alcohol, and nearly insoluble in ether or chloroform. The alcohol in the tincture is not present in sufficient amount to dissolve all of the morphine sulphate, and the ether and chloroform would throw out about all that the alcohol dissolves. As a rule, the free alkaloids are much more soluble in ether or chloroform than are their salts, but morphine is an exception. Morphine dissolves in 300 parts of alcohol (not enough in the two ounces of the tincture to dissolve the amount that would correspond to 15 grains of the sulphate), in 4000 parts of ether, or 6000 parts of chloroform. It is impossible to get the morphine sulphate or the free alkaloid into solution. The prescription should not be dispensed.

### 209.

In neutralizing tincture of ferric chloride by adding ammonia water to it a precipitate is formed, consisting of ferric hydrate and basic ferric chloride. If the ammonia water is added to a part of the syrup, and then this added to the tincture of iron previously diluted with the balance of the syrup, no precipitation will occur even though an excess of ammonia is used. The resulting fluid is of a very dark red color. The syrup acts as a solvent for the ferric hydrate. It is better to add a strong solution of ammonia than a weak one, as the water dilutes the syrup so much that it may not prevent the precipitation.

**210.**

This makes at first a clear colorless solution, but within a day or two becomes of a dark brownish-red color. On standing a few days there is a slight precipitation, the amount depending on the condition of the salt and the spirit. If the salt is neutral and the spirit strongly acid a small amount of salicylic acid will be thrown out of solution. By neutralizing the acid the precipitation is prevented and the coloration hindered, although care must be used not to make the solution alkaline, as an alkaline solution of a salicylate quite quickly becomes colored. Possibly there is some nitrosalicylic acid formed in this prescription. The directions are: Mix. Label: Dessertspoonful three times a day.

**211.**

On adding the sulphurous acid to the tincture of iron the mixture becomes of a much darker red color at first and then nearly colorless. The glycerin may now be added and then the potassium chlorate dissolved in the water. There is barely a sufficient amount of water to dissolve the chlorate at the ordinary temperature, and after mixing with the other ingredients some of the salt is thrown out of solution by the alcohol of the tincture. Different chemical reactions take place, depending on the order of mixing. The possible reactions are as follows: 1. Between the ferric iron and the sulphurous acid, forming ferrous sulphate and hydrochloric acid. 2. Between the potassium chlorate and the hydrochloric acid in the tincture, forming chlorine. 3. Between the chlorine and the ferrous sulphate, forming a ferric salt and a chloride. 4. Between the chlorine and the sulphurous acid, forming sulphuric and hydrochloric acids. 5. Between the chlorine and the glycerin. 6. Between the potassium chlorate and the sulphurous acid, forming potassium sulphate and hydrochloric acid.

**212.**

This prescription was filled by dissolving the inorganic salts in the water and the camphor in the alcohol. The tincture was added to the alcoholic solution and then the two solutions mixed. A turbidity resulted at once, and on standing for some time crystals were formed. This is due to the insolubility of the inorganic salts in the alcohol, which throws them out of their aqueous solution.

**213.**

There is barely enough of water to dissolve the borax, it being soluble in 16 parts of water. Mercuric chloride requires about 16 parts of water, and the twenty grains would require about two thirds of an ounce. If the mercuric chloride is dissolved in part of the water, and the borax is mixed with the balance of the water and then with the corrosive sublimate solution, or if the borax is dissolved in the water and then the mercuric chloride added to this, the result will be about the same. In either case there will be formed a dark reddish-brown precipitate of an oxychloride of mercury, and also a white precipitate of borax or boric acid. The mercury is ultimately entirely precipitated. If heat is used in dissolving the borax there are quite large clear crystals formed on standing, probably borax. The directions are: Make a lotion. Use frequently.

**214.**

The carbonate in the Fowler's solution precipitates the ferrous carbonate, which is white if purely ferrous, but quickly oxidizes, changing to a dark green. This slowly oxidizes still more, forming a red-brown basic ferric salt. Probably some of the arsenic is also precipitated. The sugar in the syrup tends to prevent the oxidation of the ferrous carbonate.

**215.**

Piperazin is so deliquescent that it becomes liquefied when exposed to air; consequently it cannot well be dispensed in the form of powders. Probably the best way is to put it into good capsules, and even then it may liquefy. It also absorbs carbon dioxide from the air. The directions are: Let it be triturated well. Let 12 powders be made.

**216.**

The cocaine hydrochloride is best dissolved in a little water before mixing with the base. No difficulty is experienced in filling this prescription, but the use of a metallic spatula must be avoided.

**217.**

Crystallized carbolic acid when triturated with lead acetate or with thymol gives a liquid, and the reaction cannot be prevented by first mixing the ingredients with separate portions of the base and then rubbing these together. The mass is too soft to make into suppositories, and it is necessary to use some drying-powder or spermaceti to stiffen it. The directions are: Mix carefully. Make 10 suppositories.

**218.**

Three chemical reactions may take place in mixing these ingredients. One is between the sodium benzoate and the sulphuric acid, forming sodium sulphate and benzoic acid. The benzoic acid is only sparingly soluble in water, but there is enough of alcohol in the elixir to keep it in solution. Another reaction is between the sulphuric acid and the quinine sulphate, making the soluble bisulphate. The third reaction is between the sodium benzoate and the quinine salt, forming quinine benzoate, which is not very soluble in water. The prescription was filled by dissolving the quinine sulphate

in part of the elixir and the benzoate in the remainder and then mixing the solutions. Precipitation commenced almost at once and in a short time there was a solid mass of needle-shaped crystals. This could be shaken up so that it could be poured.

### 219.

The quinine sulphate was dissolved in the tincture of iron with the hydrobromic acid and then an aqueous solution of the corrosive sublimate added. A precipitation commenced at once and continued for some time. Mercuric chloride is a general alkaloidal reagent, and so also is the double compound that it forms with the hydrobromic acid; these combine with the quinine to form insoluble compounds. In such a prescription as this the danger lies, not in the precipitation of the quinine, but of the mercuric chloride, and in this particular instance it is almost entirely thrown out of solution. This prescription might be considered dangerous to dispense.

### 220.

The potassium nitrate and the lead acetate were powdered separately and then mixed with the oil. To this the sulphuric acid was added slowly with constant stirring, avoiding letting the mixture get hot. The carbolic acid was added last. The mixture thus produced was black and thick. Several reactions ensue, depending to some extent upon the order of mixing. 1. Sulphuric acid with lead acetate gives lead sulphate and acetic acid. 2. Sulphuric acid with potassium nitrate forms potassium sulphate and nitric acid. 3. The nitric acid may act on the oil, oxidizing it. 4. The nitric acid may act upon the carbolic acid, forming picric acid. 5. The sulphuric acid forms with carbolic acid sulphocarboic acid. 6. Sulphuric acid has a carbonizing effect upon the oil.

**221.**

No matter what order is used in mixing these ingredients a clear solution cannot be obtained. Several chemical reactions are liable to take place. 1. Potassium acetate with tincture chloride of iron gives a red solution of ferric acetate. 2. Potassium acetate with a solution of quinine sulphate gives the almost insoluble quinine acetate. 3. Sodium bicarbonate precipitates morphine from a solution of its salt. 4. Sodium bicarbonate precipitates ferric hydrate from the tincture of iron. 5. Sodium bicarbonate precipitates the quinine from a solution of the sulphate. 6. The morphine sulphate gives a blue-green solution with the tincture of iron. By replacing one half of the water with glycerin the precipitation can be prevented to some extent.

**222.**

The strychnine and the iodoform are insoluble in the syrups. The strychnine sulphate should be used instead of the alkaloid and then it will dissolve in the syrups. The iodoform should be finely powdered before mixing with the other ingredients and a "Shake" label should be put on the bottle. Very frequently syrup of hydriodic acid contains some free iodine, which would precipitate the alkaloids, but by mixing the two syrups first the iodine is reduced by the hypophosphorous acid in the syrup of hypophosphites. There is perhaps a little danger of the hydriodic acid precipitating the strychnine, as under certain conditions iodides precipitate that alkaloid.

**223.**

On adding a part of the glycerin to the balsam a nearly solid mass results which is thinned some by the balance of the glycerin so that it will run slowly. There may be some chemical reaction, but more probably the thickening is due to the separation of part of the resinous matter. On standing



exposed to the air the glycerin absorbs moisture and the mixture becomes thinner, the balsam coming to the top. The odor of the iodoform is destroyed, the balsam combining with the iodoform (U. S. D., 741).

**224.**

The vaselin will not dissolve in the bay rum and on being melted and shaken with the bay rum until cold separates in a mass. Acacia cannot be used to emulsify it on account of the alcohol present. The addition of soap or resinous matter in admissible amounts does not help it. If lanolin is used instead of petrolatum the acid can be mixed with it and about one half of the alcohol, making a homogeneous mass, but the balance of the alcohol separates. The amount of carbolic acid is very large, the mixture being so strong as to quickly make the skin white. The prescriber should be consulted.

**225.**

If the sodium salicylate is dissolved in a little water and then added directly to the tincture of iron ferric salicylate is precipitated. This can be prevented by diluting the iron with the solution of ammonium acetate. The oil of winter-green does not dissolve in the glycerin or the mixture of other ingredients. The solution is colored deep red by the ferric salicylate. If the tincture of iron and the solution of ammonium acetate are quite strongly acid there may be a precipitate of salicylic acid.

**226.**

Exalgin triturated with camphor makes a damp powder, or with salol it gives a liquid. Salol and camphor triturated together give a liquid. This mixture cannot be dispensed in the form of powders unless a large amount of some absorbing-powder, as slippery elm, is used. Perhaps the best way to dispense this combination would be to get the prescriber's

consent to make an emulsion with water and acacia, using some expressed oil of almond to aid the emulsification.

### 227.

The mercuric chloride with potassium iodide gives the potassium mercuric iodide (Mayer's reagent) which precipitates nearly all alkaloids, quinine not being an exception. The precipitation is prevented to considerable extent by the presence of alcohol, but there is not a sufficient amount here. In filling this prescription Mr. Martindale advises the use of one and a half ounces of glycerin in place of a like amount of water, when no precipitation occurs. His directions are to rub the quinine with the glycerin, then add the iodide, the tincture, the spirit, and lastly the mercuric chloride dissolved in water.

### 228.

On mixing these two ingredients a white precipitate of calcium carbonate is formed, the spirit containing ammonium carbonate. The lime water also throws out of solution the oils of the aromatic spirit. Ordinarily the precipitate would not be filtered out but the mixture dispensed with a "Shake well" label.

### 229.

The bismuth subnitrate is not dissolved. The aromatic spirit of ammonia precipitates the zinc as zinc carbonate, due to the presence of ammonium carbonate. The carbonate may be slowly decomposed by the bismuth subnitrate, liberating carbon dioxide, which might burst the bottle if tightly corked. Tragacanth is perhaps as good as anything for suspending bismuth subnitrate. A "Shake well" label is necessary.

**230.**

Ergotin does not mix well with alcohol and should be rubbed up with a little water first and then triturated thoroughly with the tincture. The mixture is not clear at best.

**231.**

Reaction takes place between the two chemicals, resulting in the formation of the soluble ammonium acetate and the precipitation of a white basic carbonate of lead, which is really a carbonate and hydrate combined in various proportions. All the lead is precipitated. As it is for external use, it may be dispensed.

**232.**

This prescription would make pills weighing nearly eight grains each even though no excipient is used, and as two of the ingredients are liquids, it would require a large amount of an absorbent powder to make a mass and the pills would be entirely too large. A smaller amount of excipient can be used, and at the same time a larger amount of medicinal matter can be taken, in the form of capsules than in a pill. This prescription should either be put into capsules or be made into two or three times as many pills as directed, of course increasing the number to be taken at a dose.

**233.**

Several chemical reactions take place, depending on the order of mixing. The quinine sulphate is not all dissolved by the elixir. 1. The sodium salicylate combines with the quinine salt, forming the nearly insoluble quinine salicylate. 2. The quinine sulphate forms with the mercuric chloride a double compound which is insoluble in water but soluble in alcohol. In this particular instance there is not enough of alcohol in the elixir to dissolve it. 3. The quinine is also

precipitated as the free alkaloid by the alkali in Fowler's solution. 4. An alkaline solution of potassium arsenite reduces mercuric chloride to calomel, but in this prescription there is not enough to make any trouble. In filling this, quite a bulky precipitate results, but by increasing the alcohol so that it will be about fifty per cent. there will be little or no precipitation.

#### 234.

The U. S. Dispensatory (17th ed., 716) gives a formula for making the colorless hydrastis, which consists of twenty grains of hydrastine hydrochloride or sulphate dissolved in a pint of a mixture of glycerin and water. In this prescription we have the borax decomposed by either the honey or the glycerin, forming boric acid and sodium metaborate. The boric acid liberates carbon dioxide from the sodium bicarbonate. Carbon dioxide may also be liberated by the bismuth subnitrate, bismuth subcarbonate being slowly formed. The bicarbonate of sodium may also liberate the hydrastine from the acid with which it is combined, but the alkaloid will not be precipitated in the presence of so much honey, glycerin, and water.

#### 235.

The compound liniment of camphor contains ammonia, and this with the iodine forms ammonium iodide and a little ammonium iodate. The mixture at first is red-brown, but becomes colorless as the iodine is changed. There is some danger of forming the explosive iodide of nitrogen. [See under IODUM.]

#### 236.

This mixture quickly becomes blue, the color gradually deepening, and a turbidity is produced. The addition of an acid turns it red. Mention is made of this change in Allen's

Organic Analysis (vol. II. p. 539), and also in Muir and Morley's edition of Watts' Dictionary (vol. III. p. 832), but no explanation is given nor intimation of the chemical change which takes place.

### 237.

The trouble in filling this prescription comes in getting the extracts into solution. The best way is to make a very strong aqueous solution of the chloral hydrate and this will dissolve the extracts; to this solution add the alcohol and then the water containing the bromide, the latter solution to be added slowly with constant stirring. Some precipitate will form but it can be readily diffused through the liquid by agitation. Using another ounce of alcohol makes a better solution.

### 238.

In Scoville's Art of Compounding the statement is made that sodium bicarbonate with calomel forms corrosive sublimate slowly, the change not taking place within four to six weeks ordinarily, so that, except under unusual conditions, any prescription would be used before mercuric chloride is formed. It is a very common practice of physicians to direct the use of these two chemicals together and no ill effect seems to have resulted.

### 239.

Sodium bicarbonate requires 11.3 parts of water for solution. While there is sufficient water to dissolve the two salts and the acid, a precipitate very slowly forms after the addition of the chloroform, due, probably, to the throwing out of solution some of the bicarbonate by the chloroform. The chloroform is not all dissolved, but sinks to the bottom. In dissolving sodium bicarbonate in water heat should not be used, because carbon dioxide is liberated, forming the normal

sodium carbonate. Carbolic acid does not liberate carbon dioxide from the sodium bicarbonate.

**240.**

When antipyrin is rubbed with resorcin a pasty mass results, and this gradually becomes liquid. Acetanilid and resorcin triturated together make a liquid. When an aqueous solution of antipyrin is mixed with a solution of resorcin a white precipitate is formed. Acetanilid requires 194 parts of water for solution, so that in this prescription it will not be all dissolved. No matter how this is filled a clear solution cannot be made without the addition of alcohol or some other solvent.

**241.**

Cocaine hydrochloride is soluble in 2800 parts of ether or 3.5 parts of alcohol. As collodion is made up of 3 volumes of ether to 1 of alcohol, this salt will not dissolve in it. The free alkaloid cocaine is readily soluble in alcohol or ether, and consequently in collodion. The free alkaloid should be used and the prescriber notified of the change.

**242.**

Atropine sulphate is nearly insoluble in fixed oils. The free alkaloid is soluble in 38 parts of olive oil, and this is what should be used in filling this prescription. The physician should be notified of the change.

**243.**

The chromic acid and cocaine hydrochloride were dissolved in separate portions of water, using one dram for each, and these solutions were mixed. A heavy yellow sticky precipitate formed which made a mass. It is necessary to use about twelve drams of water to get a clear solution and then it may precipitate on standing for a time. Alcohol or glycerin

cannot be used with chromic acid. It cannot well be dispensed as written.

**244.**

The spirit of nitrous ether gives a blue color with a fresh tincture of guaiac but a brown one with a tincture that has been exposed to the light for a time. The nitrous acid would probably affect the alkaloid colchicine, since it is so easily decomposed. Acids usually give yellow solutions with colchicine, but this change would not be noticed here. The syrup precipitates resinous matter from the tinctures.

**245.**

The potassium sulphide in the "liver of sulphur" precipitates part of the zinc as the white zinc sulphide. There is left in solution some zinc sulphate, potassium sulphate, and potassium thiosulphate.

**246.**

The aromatic sulphuric acid was probably added to reduce the bulk of the quinine, but an incompatibility is thereby introduced. The acid will liberate the carbon dioxide from the mass of carbonate of iron, causing the pills to swell and forming ferrous sulphate. The acid should be omitted.

**247.**

There will be a little silver permanganate thrown out of solution, it being soluble in 109 parts of water. This salt, like other silver salts, is decomposed by light and also by heat.

**248.**

Thymol and menthol liquefy when triturated together. If a powder were used to mass the liquid the required cap-

sule would be entirely too large to swallow. By putting in the menthol, then the guaiacol carbonate, then the thymol, and lastly the eucalyptol, a kind of mass will be formed, but it will be necessary to seal the capsules. Or a drying powder can be used and the number of capsules and the dose be increased.

#### 249.

Benzoic acid is soluble in 500 parts of water and salicylic acid in 450 parts of water. If the directions to make a solution with the aid of heat are followed the acids on cooling will separate out in much larger crystals than at first. A better mixture will be obtained by rubbing the acids well in the mortar and then mixing with the water and cocaine salt in the cold. The acids do not precipitate the alkaloid.

#### 250.

The analysis of antikamnia shows it to contain some sodium bicarbonate, which would react with each of the other ingredients of the prescription if a mass were made of them. The capsules would necessarily be too large even though the ingredients were made into a mass. The dose of strychnine is too large; the usual maximum limit is  $\frac{1}{20}$  of a grain, although some authorities give it as high as  $\frac{1}{12}$  grain. The prescriber should be consulted.

#### 251.

The oil, chloroform, spirit of camphor, and aromatic spirit of ammonia mixed make a clear solution, but on the addition of the tincture and the whiskey the oil and chloroform are thrown out of the solution, and on standing the mixture separates into two clear layers the lower one being chloroform and oil. There is no danger of the morphine being precipitated, for, although the free alkaloid is formed by the ammonia, there is enough of alcohol and chloroform to keep it in solution.



**252.**

The carbonate in the solution of potassium arsenite precipitates the yellow-white silver carbonate. The arsenic also combines with the silver, forming yellow silver arsenite, which is insoluble in a neutral aqueous liquid. In this prescription the silver is not all precipitated. The yellow-white precipitate becomes dark on standing for a day, with the formation of silver oxide or metallic silver or both.

**253.**

In the presence of moisture the potassium iodide reacts with the mercurous iodide, forming metallic mercury and the more active mercuric iodide. The potassium chlorate in the presence of a mineral acid, as the hydrochloric acid of the gastric juice, causes the liberation of iodine. It should not be dispensed as written.

**254.**

Castor oil and nearly all other fixed oils do not make clear solutions with glycerin. A "Shake well" label is necessary for this prescription. The oil need not be emulsified, as the two liquids are thick and do not separate quickly.

**255.**

The ammonia and the oil in the liniment reduce the iodine to an iodide, the fresher the liniment and the more ammonia present, the larger the proportion of iodine reduced. The oily matter is rather heavier than the alcohol and it forms a globule in the bottom of the mixture. The two liquids can be readily mixed by agitation.

**256.**

The two ingredients cannot be mixed so as to make a homogeneous mass as the alcohol does not mix with fatty

matter. The iodine combines with the mercury to form mercurous iodide and then mercuric iodide. In a day or two the liquid becomes nearly colorless. There is no way to remedy the trouble except by rewriting the prescription.

**257.**

The antipyrin was dissolved in the syrup and added to the syrup of iodide of iron without producing any apparent change at first. After a day or two, however, the liquid became dark red and a crystalline precipitate of a deep-red color began to form. These crystals grew as the liquid was allowed to stand. Their composition was undetermined.

**258.**

Potassium permanganate oxidizes carbolic acid to oxalic acid and carbon dioxide. (Morley and Muir, 111, 832.) The permanganate is reduced and precipitated as manganese dioxide, which makes the mixture a semi-solid, but by shaking it may be gotten into a condition so that it can be poured. There is a large excess of carbolic acid not oxidized.

**259.**

If a solution of borax is added to a solution of lead acetate a white precipitate of lead borate is formed. Or if the glycerin is added to the solution of lead acetate and then the borax solution added a precipitate is also formed. But if the glycerin is added to the borax solution first the borax is decomposed, with the ultimate formation of sodium metaborate and boric acid, making an acid solution which does not precipitate the lead.

**260.**

The iodine is reduced by the tannic acid, but not completely, and a turbid mixture is made. According to the U. S.

Dispensatory (p. 101), hydriodic acid is formed and combines with a portion of the tannic acid and remains in solution, while the oxygen of the decomposed water combines with another portion of the tannic acid to form an insoluble compound. This mixture is capable of dissolving iodine.

**261.**

If the potassium chlorate and the glycerin are rubbed together an explosion is liable to occur. The chlorate and acid react to form a chloride and sulphate. After a day or two no odor of sulphurous acid can be detected. The chlorate does not all dissolve in the water, but the excess should not be filtered out, as it is to be mixed with more water before being used.

**262.**

Chromic acid oxidizes glycerin to oxalic and carbonic acids; it oxidizes alcohol to aldehyde and acetic acid. There is great danger of causing an explosion or igniting the organic matter in filling this prescription. The reaction is very violent. The chromic acid is changed to an insoluble oxide of chromium.

**263.**

The National Dispensatory (p. 847) states that when the first two ingredients are rubbed together explosion takes place, due to the formation of iodide of nitrogen. By mixing the first two ingredients with separate portions of lard and then mixing these there is but little danger. The iodine is reduced and the ointment becomes nearly white.

**264.**

When the salol is added to the tincture of iron a dark-green to red mixture is produced. The salol is partially dissolved, but is nearly all precipitated when the syrup is added.

According to the U. S. Pharmacopœia, with a dilute solution of iron an alcoholic solution of salol gives a violet color, while a dilute solution of salol added to the iron solution gives a whitish turbidity.

### 265.

The tincture of iodine and the collodion mix without any trouble or any reduction of the iodine even on standing for several days. But when the ammonia water is added and thoroughly shaken with the mixture it coagulates the collodion, making a thick liquid, the iodine is changed chiefly to ammonium iodide and a little ammonium iodate, and there is danger of some explosive iodide of nitrogen being formed. Adding water to collodion tends to throw the pyroxylin out of solution and ammonia water has a similar effect. This is not so marked when stronger ammonia water is used. One physician who wrote a similar prescription afterwards said that he wanted and expected to get the stronger water. This prescription can be filled by using the spirit of ammonia. By using twice the amount of collodion the coagulation is avoided but a deposit forms after a time.

### 266.

Shaking the solution of potassium hydrate with the olive oil gives a white emulsion; some soap is formed in the reaction and this acts as an emulsifying agent. The compound iodine solution added to this gives a red-brown mixture, which slowly loses its color, becoming white within a few hours. The iodine is partly changed by the alkali, forming an iodide and an iodate. Part of the iodine combines with the oil to form a nearly colorless compound in which two atoms of the iodine are combined with one molecule of oleic acid.

### 267.

This mixture makes a clear solution at first, but soon commences to become turbid and give a slight deposit. This is

due to the action of the ferric chloride on the cinnamic aldehyde in the oil of cinnamon which is in the water. The arsenic and quinine are not precipitated.

**268.**

This ointment, which is nearly white at first, soon becomes darkened and ultimately nearly black. The pyrogallic acid is oxidized and turned black by contact with air and light. It is also oxidized by the mercuric chloride, which is reduced to metallic mercury, while the pyrogallic acid is changed to acetic and oxalic acids (Richter, 695).

**269.**

When the first two ingredients are rubbed together a liquid is produced, and this mixed with the lard makes a very thin ointment in warm weather. The prescription was filled by replacing one half the lard by that amount of simple cerate. Rubbing the ingredients with separate portions of lard and then these together seems not to prevent the reaction between the exalgin and naphthol.

**270.**

The two liquids do not mix to form a clear solution. On allowing the mixture to stand the oil rises to the top. A "Shake well" label is necessary. The two liquids are so thick and viscid that the separation is slow.

**271.**

On adding a solution of pyrogallol to a solution of lead acetate a white precipitate is formed, which turns dark in a few days, the upper portion getting black much sooner than the lower. The lead in this prescription is not all precipitated.

**272.**

If the oil is emulsified and then the borax dissolved in the water is added a tough solid mass is formed. If, however, the borax is dissolved in the syrup with a little water and then added to the emulsion no trouble is experienced. Sugar prevents the gelatinizing effect of borax on the acacia.

**273.**

This prescription was filled by dissolving the salts in separate portions of water and then mixing. After a few hours a crystalline precipitate began to appear. The strychnine was liberated from the sulphate by the cyanide solution, which was alkaline. Potassium cyanide is generally more or less alkaline, depending upon its exposure to air. The carbon dioxide of the air decomposes it, liberating hydrocyanic acid. After neutralizing the potassium cyanide with sulphuric acid no precipitation resulted.

**274.**

While these ingredients make a homogeneous mixture, on allowing it to stand the glycerin separates out. By using three fourths of a dram of lanolin in place of that much of the ointment, and rubbing with it the glycerin and borax and then the ointment, an excellent mass is formed, from which the glycerin does not separate.

**275.**

The two salts were dissolved in separate portions of the syrup and then mixed. A turbidity resulted, and on filtering out the white precipitate and adding ammonia to it it was darkened, indicating calomel. The tartar emetic reduces the mercuric chloride to mercurous chloride (M. & M., iv. 643).

**276.**

Codeine is strongly basic and liberates ammonia from a solution of ammonium chloride. This can be readily proved by suspending wet red litmus paper in the bottle over the liquid. The National Dispensatory (p. 515) says that codeine also liberates morphine from its salt, so that in the presence of the ammonia which is formed in this prescription there is some danger of the morphine being precipitated. A slight precipitate makes its appearance after some hours and gradually increases, but the morphine is not nearly all thrown out of solution. A salt of codeine, as the sulphate, should be used.

**277.**

When lime and sulphur are boiled together a red solution is formed. The calcium and sulphur unite to form calcium thiosulphate and calcium disulphide or pentasulphide, depending on the proportions. This is the first reaction in making the official precipitated sulphur.

**278.**

If the lime water is added to the solution of lead subacetate the lead is partially precipitated as lead hydrate, the amount increasing on standing. By adding the glycerin to the lead solution first the lime water causes no precipitation. The zinc oxide is insoluble and quickly settles to the bottom.

**279.**

There is some danger of causing an explosion in mixing these two chemicals. Even on mixing them in smaller amounts the chemical reaction is quite violent. There are white fumes given off and the mixture is turned brown. The odor of chlorine is soon lost. Chlorine oxidizes glycerin to oxalic and carbonic acids with intermediate products.

**280.**

Potassium acetate is very hygroscopic and soon liquefies on exposure. It is necessary to use some absorbent powder as althea and then to wrap in parchment or oiled paper. If the atmosphere is damp it may be best to dispense the powders in a bottle.

**281.**

Potassium permanganate oxidizes salicylic acid to formic acid and carbon dioxide and oxidizes the ferrous sulphate to ferric sulphate, while it is itself precipitated as manganese dioxide. There not being enough of acid to combine with all of the ferric iron, part of it is precipitated as a red-brown basic ferric salt, which with the black manganese dioxide makes a dark-brown mixture. When the solid matter settles there is left a violet-colored supernatant liquid. The violet color is due to the formation of ferric salicylate. There is not enough of permanganate to oxidize all of the salicylic acid or all of the ferrous sulphate.

**282.**

The quinine sulphate was dissolved in the tincture of iron, giving a dark-red solution. The syrup of ginger was next added and lastly the ammoniated tincture of guaiac, the first few drops of which gave a green color, that had changed to blue by the time all of the tincture was added. On standing a few minutes it had changed back to a blue-green, and then green, and in a few hours to a dark brown. Guaiac with ferric chloride or other oxidizing agent gives a blue color. The resinous matter of the guaiac and also the oils of the aromatic spirit of ammonia (the menstruum used in making the tincture) were precipitated by the syrup. The ammonia and ammonium carbonate precipitate the quinine and also the iron; the ferric hydrate is somewhat soluble in syrup, but in this case the syrup is too much diluted by the tinctures to



keep all of the iron in solution. The precipitated matter is bulky and rather gelatinous, but the mixture can be dispensed with a " Shake well " label.

**283.**

Potassium permanganate oxidizes quinine sulphate to pyridin tricarboxylic acid, oxalic acid, and ammonia (M. & M., iv. 375). It also oxidizes the iron. When the permanganate and the iron are rubbed together a detonation takes place. The excipient should be one that will not reduce the permanganate, and it should also protect the other ingredients; a mixture of equal parts of paraffin, petrolatum, and kaolin is a good one, or resin cerate with althea may be used.

**284.**

The strychnine will not dissolve in the glycerin or in the water. The consent of the prescriber to use strychnine sulphate or nitrate (the nitrate is the more common for hypodermic injection) should be obtained. In the absence of the prescriber the nitrate should be dispensed, notifying the prescriber of the change at the earliest possible opportunity.

**285.**

Carbolic acid and thymol when triturated together form a liquid which can be mixed with the vaselin and cerate, making a homogeneous mass. On allowing it to stand for a time the liquid separates to some extent, though hardly enough to do any harm. This can be prevented by using lanolin instead of petrolatum. Using one half dram of lanolin for that amount of vaselin does not entirely prevent the separation.

**286.**

Sodium phosphate precipitates a solution of lithium bromide as lithium phosphate. There is more sodium phos-

phate than the water will dissolve. Heat should not be used to aid the solution, since on cooling large crystals will form. The phosphate should be powdered and the cold water allowed to dissolve what it will. Even then the part left undissolved may form a crystalline mass that can be gotten out of the bottle only by heating.

### 287.

Podophyllin gives a black-brown color with the tincture of iron and nearly all is dissolved on warming. Quinine sulphate dissolves in this solution, and when the tincture of rhubarb is added the tannic acid in it precipitates the quinine, and with tincture of ferric chloride gives the black tannate of iron. The mixture is quite thick from the precipitated matter.

### 288.

When camphor and carbolic acid are brought together a liquid results. In order to avoid making any more liquid than was necessary the corresponding amount of solid iodine was used in place of the tincture. The iodine dissolved readily in the phenol-camphor liquid and then the powdered lead acetate was added. Kaolin was tried as an absorbent excipient, but the amount required made the pills entirely too large. Starch was then used together with some glucose syrup, so as to form the easily decomposed iodide of starch. This made the pills very large and they were finally put into capsules.

### 289.

This prescription made at first a clear pale-yellow solution. Within about an hour crystals began to form and by the next morning there was quite a heavy deposit of nearly colorless prismatic crystals besides some smaller red-brown crystals. In concentrated solutions potassium iodide pre-

precipitates the quinine as a double iodide which is white. Citric acid liberates hydriodic acid and this is oxidized by the air forming iodine. The free iodine precipitates the quinine, giving red-brown crystals.

### 290.

Phenacetin is only sparingly soluble in water, but more soluble in alcohol, although there is not enough present in this prescription to dissolve it entirely, and what is dissolved is again thrown out of solution on adding the water. Heating the phenacetin with the tincture causes solution to take place, giving a dark-red color. On adding water the color is destroyed and the phenacetin is precipitated. The best way to fill this prescription is to powder the phenacetin, mix with a little acacia, and add the water and lastly the tincture of iron. Filled in this way the phenacetin is in a finer powder than when it is first dissolved in the tincture.

### 291.

The sodium salicylate and benzoate and the carbolic acid were dissolved in the lime water, making a nearly clear colorless solution, and then the tannic acid was added. A blue-white precipitate was formed, due to the reaction between the tannic acid and lime water. The precipitate afterwards slowly turned to a dirty-yellow color.

### 292.

This gave a clear solution at first but a turbidity was noticed within an hour and by the next morning the bottom of the bottle was covered with a white precipitate which responded to the tests for calomel. Mercuric chloride is slowly reduced to calomel by alcohol (M. & M., I. 98). This does not explain the ready reduction that occurs, and the writer is inclined to think that the nitrous ether or acid has some effect, notwithstanding the fact that some writers say that

nitrous acid does not reduce mercuric salts. (See P. & J., 203.)

### 293.

The solution of morphine contains some free hydrochloric acid, which reacts with the potassium chlorate, with the formation of a very small amount of chlorine. The chlorine oxidizes a portion of the morphine, giving a pale-brown solution. By dissolving the chlorate in the water and diluting the solution of the morphine with the syrup and then mixing, scarcely any coloration is produced, and none when the free acid is neutralized.

### 294.

The mercuric chloride reacts with the hydriodic acid, forming the red iodide of mercury, and then this combines with more hydriodic acid to form a soluble double compound which precipitates the cinchona alkaloids. Extractive matter in the fluid extract is also precipitated by the water in the syrups and solution. There is such a small amount of mercury precipitated that the mixture is not a dangerous one. It should be dispensed with a "Shake well" label.

### 295.

Adding the tincture to the syrup produces a gelatinous precipitate which dissolves on adding the acid. The precipitate is ferric hypophosphite which is decomposed by the phosphoric acid forming ferric phosphate which is soluble in excess of acid. If the prescriber had used hydrochloric acid instead of the phosphoric the precipitate would have not dissolved, the iron having a stronger affinity for the hypophosphorous acid than for hydrochloric but less than for the phosphoric.

**296.**

The syrup of iodide of iron frequently contains some free iodine, which would precipitate the quinine. By warming the two syrups the iodine is reduced by the hypophosphorous acid in the syrup of hypophosphites. When quinine sulphate dissolved in the phosphoric acid is added to the mixed syrups a white amorphous precipitate is formed which is probably calcium sulphate. Some of the quinine is also precipitated on allowing the mixture to stand.

**297.**

By dissolving the morphine in a little water and adding it to the tincture of iron a blue solution is formed which quickly turns green. When the calcium hypophosphite, dissolved in the water and syrup, is added a white precipitate of ferric hypophosphite is thrown down. The color of the solution is nearly but not entirely destroyed. By adding the morphine dissolved in water to the mixture of other ingredients no coloration is produced, and this is the method that should be followed, as the morphine is not decomposed by the iron hypophosphite. The precipitate of ferric hypophosphite can be dissolved by adding some potassium citrate to the moist magma. A better method of filling is to use the tincture citrochloride of iron of the National Formulary instead of the official tincture of iron, the two tinctures having the same iron strength. By using it no precipitation takes place for several days at least.

**298.**

The doses of the first two ingredients are too large. The maximum dose of mercuric chloride is about  $\frac{1}{6}$  of a grain and of sodium arsenate about  $\frac{1}{9}$  of a grain. The prescription should not be dispensed without first consulting the prescriber. Should it be filled the potassium carbonate will react

with the strychnine, the mercury, and the iron salts, but the activity is not increased.

### 299.

The soap acts as an emulsifying and solidifying agent and the consistency of this mixture is about that of lard. Soap is nearly always alkaline and acts on the calomel, producing the black mercurous oxide. This explains why the mixture slowly turns dark.

### 300.

This prescription was filled by dissolving the quinine sulphate in a portion of the water with the aid of the acid; the potassium iodide dissolved in the balance of the water was added and lastly the sodium arsenate solution. The solution was clear and of a pale-yellow color. Within five minutes precipitation had commenced, and in less than fifteen minutes there was quite a heavy purple-red precipitate. Within a few hours a solid mass had formed which was of a purple-chocolate color. Sodium arsenate in the presence of an inorganic acid oxidizes potassium iodide, liberating iodine, and this precipitates the quinine.

### 301.

If the directions to use enough of the extract of glycyrrhiza to make a pill-mass be followed, the pills will be entirely too large. The best way is to melt one gram of beeswax, add the balsam and stir till the mixture is cool. Then use enough of powdered liquorice root to make the mass. Some would prefer to make twice the number of pills and double the dose.

### 302.

It is impossible for the dispenser to tell what the prescriber wanted. "Hyd." may stand for hydrochloric, hydro-

bromic, hydriodic, or hydrocyanic. From the directions to the patient to take after meals probably hydrochloric was what was intended, but it would be necessary to consult the physician.

### 303.

By rubbing the powdered tragacanth with the petrolatum, then adding the glycerin and zinc oxide, a comparatively smooth ointment can be made, but the glycerin separates on standing. The glycerin and tragacanth should be heated together, with the addition of a little water if necessary, so as to make a glycerite of tragacanth, and then mixing this with the other ingredients a smooth permanent ointment can be made.

### 304.

Potassium iodide is deliquescent in moist air, and on powdering, even in the ordinary atmosphere, it becomes damp. It may be necessary to add some absorbing-powder. The powders should be dispensed in paraffin or wax paper.

### 305.

In making ointments the medicinal ingredients must be in the form of a fine powder, soft solid, or solution. Iodine is powdered with difficulty. It might be dissolved in alcohol and this solution added to the lard. The U. S. Pharmacopœia directs that it be dissolved in an aqueous solution of potassium iodide, using one fourth as much potassium iodide as iodine and twice as much water as iodide. Lard will hold nearly 10 per cent. of its weight of water.

### 306.

This was filled by dissolving the quinine in a little water with the aid of the acid, adding the syrup, and lastly the potassium chlorate dissolved in the water. The solution was.

clear and nearly colorless at first, but in a few minutes a red-brown precipitate began to form and increased until the mixture was quite thick. Sulphuric acid liberates chloric acid from the potassium chlorate, and this oxidizes the ferrous iodide, liberating iodine, which precipitates the quinine.

### 307.

Phenacetin requires 1400 parts of water or 6 parts of alcohol for solution. In filling this prescription the phenacetin can be dissolved in the tincture and spirit, but on adding the syrup and water nearly all of it will be thrown out of solution. A better mixture would be made by powdering the phenacetin with about two drams of acacia, then adding the syrup and part of the water, and lastly the tincture and spirit diluted with the balance of the water.

### 308.

An absorbent excipient is necessary in order to make a pill-mass. To use a powder like liquorice root or althea would make the pills too large. Freshly calcined magnesia dampened with a little water is the best, as it is only necessary to use six or eight grains. The magnesia combines with the copaibic acid in the balsam to form a solid mass; a little water aids the reaction and it may be necessary to use the heat of a water-bath. A little drying powder will still be required.

### 309.

With bismuth subnitrate salicylic acid forms a series of nitrosalicylates of bismuth, varying in color from a white to a reddish orange. This mixture gives a faint pink color after standing for a time.

### 310.

Chloral hydrate rubbed with phenacetin gives a liquid, a sticky mass is also obtained when chloral hydrate is rubbed



with quinine sulphate. A large amount of an absorbent powder would be necessary to make this liquid into a mass, and the capsules would necessarily be very large.

### 311.

The alcohol in the tincture is without any therapeutical value in this case, and only makes the pill-mass too soft. The alcohol should be evaporated before mixing with the other ingredients unless the extract of jalap has become dry and hard, in which case it can be used to soften the extract and then evaporated.

### 312.

Twenty grains of salicylic acid require nearly nineteen fluid ounces of water for solution, but in this case the acid combines with the calcium hydrate to form a soluble calcium salicylate. The solution is clear and slightly acid.

### 313.

When the acetanilid is added directly to the tincture of iron and heated it makes a deep-red clear solution. On adding the water the acetanilid is precipitated and the color changed back to that of diluted tincture of iron. A better mixture can be made by powdering the acetanilid first, mixing with water and acacia or tragacanth, then adding the tincture of iron highly diluted with water. The tincture of iron, unless diluted with water, has a tendency to coagulate acacia. [See ACETANILIDUM, No. 2.]

### 314.

The hydrogen dioxide oxidizes the ferrous iron to a ferric salt and the glycerin to glyceric, oxalic, and tartaric acids, and in an acid solution reduces the bichromate to a green chromic salt. The hydrogen dioxide usually contains some sulphuric acid, which is left in to preserve it. In the presence

of free acid the bichromate oxidizes the ferrous sulphate and the glycerin. This prescription gives a heavy brown precipitate, probably of a basic ferric salt.

### 315.

So long as this mixture is kept from the light it does not change in color, but on exposure to direct sunlight for a few hours, or to diffused light for a longer period, it acquires a red color. This is due to the decomposition of iodoform, liberating iodine, and the iodine combines with and oxidizes the calomel, forming mercuric iodide.

### 316.

The trouble with this prescription is that the water breaks up the boroglycerin, liberating boric acid. Boric acid requires about 25 parts of water for solution, and there is not enough to dissolve it. By replacing one half of the water with glycerin no precipitation results.

### 317.

The salicylic acid is not soluble in the water and glycerin: it requires 450 parts of water for solution, and, according to the U. S. D. (p. 84), by careful heating it will dissolve in 50 parts of glycerin. If the acid is dissolved in the glycerin with the aid of heat and the tincture then added a clear solution results, but on adding the water a bulky crystalline precipitate comes down. A better method of filling is to rub the acid with the glycerin and water and then add the tincture. Free iodine reacts with salicylic acid, giving mono-, di-, and tri-iodobenzoic acids and tri-iodophenol (M. & M., III. 680). All of the iodine is not changed.

### 318.

The citrate of iron and quinine was dissolved in a part of the wine, making a clear acid solution. To this was added

the carbolic acid dissolved in the balance of the wine. A light-yellow sticky precipitate was formed. The composition of the precipitate was not determined, but on testing it quinine was proved to be present. Moreover, when iron citrate is used instead of the iron and quinine citrate no precipitation occurs. The precipitate is not dissolved by the further addition of the tincture, neither is precipitation prevented by adding a little dilute sulphuric acid. The tincture darkens the mixture a little and slightly increases the turbidity.

### 319.

Diuretin is sodium-theobromine salicylate and is readily soluble in water. Acids decompose it, with the precipitation of the theobromine. Theobromine differs from many alkaloids in that it does not readily combine with acids. In this prescription the diuretin was dissolved in the syrup, and then the spirit of nitrous ether added, and lastly the tincture of iron. When the iron is added a very deep violet color is produced, due to the formation of ferric salicylate, and on allowing the mixture to stand a few hours a white precipitate falls; the acids in the tincture and spirit liberate the theobromine.

### 320.

Quinine sulphate makes a sticky mass when rubbed with the chloral hydrate; the antipyrin and the chloral form a mass on being triturated together. Even if the ingredients are powdered separately and mixed lightly, the mixture becomes sticky. By the use of a little drying-powder it can be put into capsules.

### 321.

The pilocarpine differs from many alkaloids in that it is soluble in water. The hydrochloride is used much more fre-

quently than the free alkaloid. The terpin hydrate requires about 250 parts of water for solution; consequently only a small portion of it will be dissolved. A "Shake" label is necessary. A more elegant preparation would be made by emulsifying it.

### 322.

The potassium bicarbonate precipitates the ferrôus iodide as ferrous carbonate. If the iron salt is purely ferrous the carbonate will be white, but it oxidizes in the air, becoming green and after some time yellow-brown, forming a ferric oxide. A little carbon dioxide is given off. In the alkaline mixture the iron does not oxidize the iodide.

### 323.

An absorbent powder will be necessary to make a mass that can be put into capsules. When pyrocatechin is rubbed with acetanilid or phenacetin a liquid results. Acetanilid and phenacetin do not liquefy.

### 324.

This combination has perhaps caused more trouble than almost any other one prescription. The U. S. P. phosphate of iron may be a double compound of sodio-ferric citro-phosphate or it may be a mixture of ferric phosphate and sodium citrate. If it is the double compound (and there are reasons for thinking that it is) the phosphoric acid decomposes it, precipitating the phosphate of iron. If it is a mixture the explanation given is that the sodium citrate is readily soluble in water and an aqueous solution of it is a good solvent for the ferric phosphate. Now when phosphoric acid is added it is supposed that the sodium citrate is decomposed, forming sodium phosphate and citric acid; the ferric phosphate, being no longer soluble in this solution, is precipitated. This difficulty can be overcome by using strictly pure dilute

metaphosphoric acid (known also as glacial phosphoric acid) in place of the official orthophosphoric acid. A solution of metaphosphoric acid changes in time, forming some orthophosphoric acid, and if the meta-acid contain some of the ortho-variety a precipitation will occur. The dispenser must decide for himself as to the substitution proposed. There is sometimes, however, another difficulty present in this combination of ingredients. When quinine sulphate is present in a much larger proportion than two grains to the dram a precipitation of the quinine by the ortho- or the meta-acid takes place, and there seems to be no way to make a permanent solution. There is always some objection to dispensing a "Shake" mixture when it contains such an active agent as strychnine.

### 325.

In a neutral solution potassium iodide does not react with the tartrate of iron and potassium, but in the presence of the sulphuric acid the ferric salt oxidizes the iodide, liberating iodine. This iodine then combines with the quinine to form an insoluble compound. A "Shake well" label is necessary. If there were much more free iodine than would combine with the quinine the prescription should not be dispensed.

### 326.

The quinine sulphate was dissolved in the tincture of iron and a portion of the elixir added. The strychnine sulphate was dissolved in the balance of the elixir and added to the iron solution and the phosphoric acid added last. Adding the acid causes the formation of a nearly white precipitate which is phosphate of iron. If water is used in place of the elixir no precipitation results. The phosphate of iron is insoluble in water but soluble in acidulated water, and it is thrown out of solution by the alcohol in the elixir.

**327.**

This prescription was filled by rubbing the mercury with the iodine, then adding the glycerin, and lastly the tannic acid. Reaction takes place between the mercury and iodine, forming mercurous iodide and then mercuric iodide. Tannic acid reduces the iodine to hydriodic acid. Considerable red iodide of mercury is precipitated, although some is probably dissolved. This prescription is given in one of the standard works on therapeutics.

**328.**

The arsenite in alkaline solution reduces the iodine to an iodide while the arsenite becomes an arsenate. About one eighth of the iodine is reduced.

**329.**

This mixture if kept perfectly dry will not change in color, but pepsin is frequently hygroscopic and absorbs moisture in sufficient amount to enable a reaction to take place between the calomel and sodium bromide, causing the powder to turn black. Sodium bromide in the presence of moisture breaks up calomel, forming a mercuric compound and metallic mercury, the latter giving the dark color. Theoretically one half of the calomel goes to form mercuric chloride, and if this is really so there would be about one fourth of a grain of mercuric chloride to the dose which would be dangerous.

**330.**

Sodium bicarbonate is used in making the solution of saccharin, and while this solution makes a clear one with the strychnine at first yet on standing overnight the strychnine is precipitated. There is not enough of alcohol in the saccharin solution to prevent it. The strychnine frequently adheres to the sides of the bottle, but may be loose, and in that case an overdose is liable to be taken.

**331.**

The glycerite of boroglycerin which is called for can be mixed with the vaselin, but it separates on standing. Using lanolin in place of vaselin no separation occurs.

**332.**

The organic matter in the infusion changes the iodine so that it no longer gives a test with starch. The benefit derived from the iodine is questionable.

**333.**

The glycerin was added to the tincture of myrrh, then the solution of potassium chlorate in small amounts with continued shaking, and the tincture of iron last. Tincture of iron gives a dark green-brown color with tincture of myrrh. Water precipitates the resinous matter from the tincture of myrrh, and it forms in masses that cannot be evenly suspended. It seems to make but little difference whether the alcoholic mixture is added to the aqueous or the aqueous to the alcoholic. By using honey instead of glycerin the resin is separated but does not form masses, consequently it can be evenly distributed through the liquid.

**334.**

The fluid extracts and elixir are sufficiently acid so that chemical reaction takes place between the potassium nitrite and the organic matter. Considerable effervescence ensues and continues for some time. Oxides of nitrogen are given off. A slight precipitate forms on standing. Probably much of the physiological activity of the mixture is destroyed by the chemical reaction.

**335.**

A mixture of these ingredients quite quickly separates into two layers, the lower one being about one fourth the

total volume. There is not sufficient alcohol to dissolve the other liquids. There is no effervescence at first, but if the bottle is tightly corked it may be burst by the gas which is slowly evolved. The liquid becomes red-brown on standing.

### 336.

A clear solution was obtained which had at first a dark violet color. The color soon changed to brown, and in a few hours a dark-brown precipitate began to form. The amount of precipitate continued to increase for some time. It was filtered out, thoroughly washed with water, and heated with water acidulated with hydrochloric acid; part went into solution and part remained undissolved. The filtrate showed the presence of iron. The part left undissolved is probably some oxidation product of carbolic acid, produced by the chlorine liberated by the acid in the tincture acting on the potassium chlorate.

### 337.

The color of this mixture is brown at first, due to the free iodine. The iodine soon combines with the free oleic acid, forming addition products which are nearly colorless.

### 338.

There is a sufficient amount of water to dissolve the potassium salts and the solution remains clear for a time after the spirit is added. It is not long, however, before crystals begin to separate. The alcohol in the spirit throws the potassium chlorate out of solution.

### 339.

When the two prescriptions are mixed in the proportions as directed the result is almost a mass. Reaction takes place between silver nitrate and potassium iodide, forming the insoluble silver iodide. It is customary to filter all preparations



intended to be dropped into the eyes, but in this case the prescriber wanted the solid matter left in. The solution marked No. 1, containing silver nitrate, began to darken within an hour, due to the reduction of silver. This reduction continued for some time. Solution No. 2 turned yellow in a few days.

### 340.

The alkaloid morphine is liberated and is dissolved to some extent by the chloroform. Only a small part of the chloroform is dissolved by the water, the remaining part goes to the bottom. The oils liberated from the aromatic spirit by water are dissolved in the chloroform. This prescription was dispensed with a "Shake well" label.

### 341.

Filled as directed this prescription gives a nearly colorless mixture which does not give a test for free iodine. On standing two layers are formed, the upper being about one third of the volume of the lower. The upper layer consists chiefly of turpentine, while the lower consists of the alcohol containing some oil of turpentine and an iodide of mercury. Leaving out either the turpentine or mercuric chloride, the iodine is not all reduced. If the mercuric chloride is left out the lower layer is smaller in volume and is nearly colorless, while the upper one is chiefly alcohol containing free iodine. The turpentine is the principal factor in reducing the iodine. The mercuric chloride perhaps acts as a carrier or acts by breaking up the compound which iodine forms with the oil, thereby allowing the oil to combine with more iodine.

### 342.

The sodium bromide and antipyrin were dissolved in syrup of lemon and a part of the water and the chloral hydrate in the balance of the water. The two solutions were mixed

and a turbidity was produced. On allowing the mixture to stand it separated into two layers, the lower being small in volume, yellow brown, and of an oily nature, and was probably a compound of antipyrin and chloral hydrate.

### 343.

Although a clear solution is produced at first, within a few minutes a crystalline precipitate begins to form. Piperazin is quite strongly alkaline and causes a precipitation of the strychnine. As written this should be considered a dangerous combination. The difficulty can be remedied by neutralizing the piperazin solution with dilute sulphuric acid.

### 344.

When chloral hydrate and ammonol are rubbed together a liquid is produced. The prescription was filled by massing with powdered liquorice root. In such a case it is preferable to use a white absorbent powder.

### 345.

A mixture of these ingredients makes a clear colorless solution at first. Antipyrin destroys the fluorescence of quinine sulphate. A white amorphous precipitate forms in a day or two and increases in amount for some time. If the prescription is filled, using distilled water instead of cinnamon water, no precipitation results. The trouble seems to be due to antipyrin, sulphuric acid, and cinnamon water, since a mixture of any two or three ingredients of the prescription other than the combination mentioned does not precipitate.

### 346.

Trional and salol produce a soft mass when rubbed together, and a drying powder is necessary.

**347.**

This prescription was filled by mixing the first four ingredients and putting into capsules and then dropping in the tincture. The next day the box in which the capsules were dispensed was brought back, the capsules had been dissolved. Sodium bromide attracts moisture from the atmosphere. Antipyrin with caffeine citrate makes a mixture that forms a sticky mass on standing a few hours. A mixture of all the ingredients makes a damp powder at first, but in a few hours it becomes almost liquid. A large amount of drying powder is necessary.

**348.**

The bottle containing this mixture should not be stoppered tightly or it may be burst. Infusion of digitalis is acid in reaction and slowly liberates carbon dioxide gas from ammonium carbonate.

**349.**

There is a sufficient amount of alcohol and water to prevent the gold salt from precipitating strychnine. However, the gold is reduced in a few hours, largely by the alcohol but partly by the syrup. The gold as precipitated has a purplish color by transmitted light but yellow or brown by reflected light.

**350.**

The potassium acetate was dissolved in water and the spirit added. Effervescence ensued and continued for a few minutes, but ceased after several shakings. Alcohol effervesces a little when mixed with water, but not nearly as much as the above mixture did. Onewriter (Scoville, 223) says that nitrous acid converts acetates into carbon monoxide and other gases. This explanation is not satisfactory since about

as much effervescence results when spirit of nitrous ether is added to a strong solution of Rochelle salt, sodium chloride, or potassium nitrate. It has been suggested that the potassium acetate or other salt throws the ethyl nitrite out of solution in the mixture of alcohol and water and that the volatilization of the ethyl nitrite is the cause of the effervescence. There is much less effervescence when the solutions have been well chilled before mixing.

A TABLE SHOWING THE EFFECT OF RUBBING TOGETHER EQUAL WEIGHTS OF TWO SOLIDS.

	Acetamid.	Acetanilid.	Antipyrin.	Bromal hydrate	Butyl chloral hydrate.	Camphor.	Camphor, borneol.	Camphor, monobromated.	Carbolic acid.	Chloral alcoholate.	Chloral hydrate.	Diuretin.	Euphorin.	Exalgin.	Lead acetate.	Menthol.	Methacetic.	Naphthalin.	Naphthol, beta.	Phenacetin.	Pyrocatechin.	Pyrogallol.	Resin.	Resorcin.	Salicylic acid.	Salol.	Sodium phosphate.	Sodium salicylate.	Thymol.	Urea.	Urethane.
Acetamid.																															
Acetanilid.																															
Antipyrin.																															
Bromal hydrate																															
Butyl chloral hydrate																															
Camphor																															
Camphor, borneol																															
Camphor, monobromated																															
Carbolic acid																															
Chloral alcoholate																															
Chloral hydrate																															
Diuretin																															
Euphorin																															
Exalgin																															
Lead acetate																															
Menthol																															
Methacetic																															
Naphthalin																															
Naphthol, beta.																															
Phenacetin																															
Pyrocatechin																															
Pyrogallol																															
Resin																															
Resorcin																															
Salicylic acid																															
Salol																															
Sodium phosphate																															
Sodium salicylate																															
Thymol																															
Urea																															
Urethane																															

L = Soft mass or liquid.

M = Stiff mass which dries.

P = Dry powder.

P' = Slightly damp powder, quickly drying.

P<sub>2</sub> = Said to liquefy, but the writer obtained a dry powder.

## TABLE OF SOLUBILITIES\*

IN WATER, ALCOHOL, ETHER, CHLOROFORM AND GLYCERIN, OF MEDICINAL SUBSTANCES OFFICIAL IN THE U. S. PHARMACOPŒIA, INCLUDING MANY OTHERS OF COMMON OR FREQUENT USE.

ABBREVIATIONS—*s.*, soluble; *v. s.*, very soluble; *sp.*, sparingly; *a.*, all proportions; *sl.*, slightly; *ins.*, insoluble; *n. ins.*, nearly insoluble; *dec.*, decomposed.

MEDICINAL SUBSTANCES. One part is soluble in [at 50° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Acacia .....	2	ins.			
Acetanilid .....	194	5	18	v. s.	
Acid, Arsenous .....	80	141			5
Benzoic .....	500	2	3	7	5
Boric .....	25.6	15			5
Carbolic .....	15	v. s.	v. s.	v. s.	v. s.
Chromic .....	v. s.	dec.	dec.	ins.	dec.
Citric .....	0.63	1.61	18	n. ins.	2
Gallic .....	100	5	40		12
Lactic .....	a.	a.	a.	ins.	
Meconic .....	sp.	v. s.			
Oleic .....	ins.	a.	a.	a.	
Oxalic .....	8.17	2.5	n. ins.	ins.	7.5
Phosphoric, Glacial .....	v. s.	v. s.	ins.		
Picric .....	86	s.	s.	s.	
Pyrogallic (see Pyrogallol) ..					
Salicylic .....	450	2.4	2	80	50
Stearic .....	ins.	45	9	s.	
Tannic .....	1	0.6	n. ins.	n. ins.	1
Tartaric .....	0.8	2.5	250	n. ins.	a.
Valerianic .....	30	a.	2	3	s.
Aconitine .....	150	5	2	3	
Alcohol .....	a.		a.	a.	a.
Amyleic .....	sp.	a.	a.		
Methylic .....	a.	a.	a.		
Aloin .....	60	20	470		
Alum .....	8	ins.	ins.	ins.	2.5
Aluminum Hydrate .....	ins.	ins.	ins.	ins.	ins.
Sulphate .....	1.2	ins.	ins.	ins.	ins.
Ammonium Benzoate .....	5	28	ins.	ins.	ins.
Bicarbonate .....	8	ins.			
Bromide .....	1.5	30	600		
Carbonate .....	5	ins.	dec.		5
Chloride .....	3	sp.	ins.		5
Iodide .....	1	9	ins.		
Nitrate .....	0.5	20			
Phosphate .....	4	ins.			
Sulphate .....	1.2	sp.			
Valerianate .....	v. s.	v. s.			
Amyl Nitrite .....	ins.	a.	a.	a.	
Antimony Oxide .....	n. ins.	ins.	ins.	ins.	
Sulphide .....	ins.	ins.			
and Potassium Tartrate .....	17	ins.	ins.	20	20
Antipyrin .....	1	1	50		
Apomorphine Hydrochloride ..	6.8	45	sl.	sl.	
Aristol .....	ins.	sp.	s.	s.	
Arsenic Iodide .....	7	30	sol.		
Atropine .....	130	3	16	4	50
Sulphate .....	0.4	6.2	2270	694	3
Balsam Peru .....		5	sp.	a.	
Tolu .....	n. ins.	s.	s.	s.	
Barium Carbonate .....	ins.	n. ins.			
Chloride .....	2.5	ins.			10
Bebeerine .....	6000	sol.	13	s.	
Sulphate .....	s.	v. s.			
Benzanilid .....	n. ins.	38			
Berberine .....	500	250	ins.		
Hydrochloride .....	600	sp.	ins.		

\* Taken from "Era Dose Book."

TABLE OF SOLUBILITIES—(Continued).

MEDICINAL SUBSTANCES. One part is soluble in [at 59° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Bismuth Citrate .....	ins.	ins.	.....	.....	.....
Oxide .....	ins.	ins.	.....	.....	.....
Oxyiodide .....	ins.	ins.	.....	.....	.....
Salicylate .....	ins.	ins.	ins.	.....	.....
Subcarbonate .....	ins.	ins.	ins.	.....	.....
Subgallate .....	ins.	ins.	ins.	.....	.....
Subnitrate .....	ins.	ins.	.....	.....	.....
Tannate .....	ins.	ins.	.....	.....	.....
and Ammonium Citrate .....	v. s.	sp.	.....	.....	.....
Bromal Hydrate .....	s.	s.	s.	s.	s.
Bromoform .....	v. sp.	s.	s.	.....	.....
Brucine .....	750	2	ins.	.....	50
Sulphate .....	v. s.	v. s.	.....	.....	.....
Butyl Chloral Hydrate .....	50	1	s.	n. ins.	1
Caffeine .....	80	33	555	7	9
Citrate .....	30	s.	.....	.....	.....
Calcium Acetate .....	s.	s.	.....	.....	.....
Benzoate .....	18	.....	.....	.....	.....
Bromide .....	0.7	1	.....	.....	.....
Carbonate .....	ins.	ins.	ins.	ins.	.....
Chloride .....	1.5	8	ins.	.....	.....
Hypophosphite .....	6.8	ins.	.....	.....	.....
Iodide .....	0.5	s.	.....	.....	.....
Lactate .....	9.12	s.	ins.	.....	.....
Phosphate .....	ins.	ins.	ins.	.....	.....
Sulphate, Dried .....	390	ins.	.....	.....	.....
Camphor .....	sp.	v. s.	v. s.	v. s.	.....
Monobromated .....	n. ins.	6	v. s.	v. s.	sl.
Cannabine Tannate .....	sl.	sl.	sl.	.....	.....
Cerium Oxalate .....	ins.	ins.	ins.	.....	.....
Chloral .....	v. s.	v. s.	v. s.	v. s.	s.
Chloroform .....	200	a.	a.	.....	.....
Chrysarobin .....	sp.	sp.	s.	.....	.....
Cinchonidine .....	1680	20	70	10	.....
Hydrochloride .....	27	s.	n. ins.	n. ins.	.....
Sulphate .....	70	66	ins.	1316	.....
Cinchonine .....	3760	116	526	163	200
Hydrochloride .....	22	1	550	.....	.....
Sulphate .....	66	10	ins.	78	16
Cocaine .....	700	v. s.	v. s.	.....	.....
Hydrochloride .....	0.48	3.5	2800	17	.....
Codeine .....	80	3	30	2	.....
Hydrochloride .....	20	.....	.....	.....	.....
Sulphate .....	35	.....	.....	.....	.....
Phosphate .....	4	sp.	.....	.....	.....
Coniine .....	100	v. s.	6	1	.....
Hydrobromide .....	2	2	s.	s.	.....
Copper Sulphate .....	2.6	n. ins.	ins.	.....	3.5
Creosote .....	150	s.	a.	a.	.....
Digitalin .....	1000	s.	ins.	.....	.....
Digitin .....	s.	.....	.....	.....	.....
Diuretin .....	sl.	.....	sp.	.....	.....
Duboisine .....	500	v. s.	s.	s.	.....
Sulphate .....	s.	s.	.....	.....	.....
Elaterin .....	4250	337	543	2.4	.....
Emetine .....	2000	s.	sp.	v. s.	.....
Ergotinine .....	ins.	v. s.	v. s.	v. s.	.....
Ether, Acetic .....	8	a.	a.	.....	.....
Sulphuric .....	12	a.	.....	a.	.....
Ethyl Bromide .....	sp.	a.	a.	s.	.....
Iodide .....	n. ins.	v. s.	v. s.	.....	.....
Eucalyptol .....	.....	a.	.....	.....	.....
Euphorin .....	sl.	.....	.....	.....	.....
Euophen .....	ins.	.....	.....	s.	.....
Glycerin .....	a.	a.	ins.	ins.	.....
Glycyrrhizin, Ammoniated .....	s.	s.	.....	.....	.....

TABLE OF SOLUBILITIES—(Continued).

MEDICINAL SUBSTANCES. One part is soluble in [at 59° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Gold Bromide (mono).....	ins.				
(tri).....	s.				
Chloride (tri).....	s.	s.	s.		
Iodide.....	ins.	ins.			
and Sodium Chloride.....	2	sp.			
Guaiacol.....	200	a.	a.		
Benzoate.....	ins.	s.	v. s.	v. s.	
Hydrastinine.....	n. ins.	v. s.	v. s.	v. s.	
Hydrochloride.....	0.3	3	n. ins.	n. ins.	
Hyoscyne.....	sl.	v. s.	v. s.		
Hydrobromide.....	4	25.5	sl.	sl.	
Hydrochloride.....	s.	ins.	ins.		
Hyoscyamine.....	500	v. s.	s.	s.	
Hydrobromide.....	0.3	2	3000	250	
Sulphate.....	0.5	2.5	sl.	sl.	
Hypnone.....	n. ins.	v. s.	v. s.	s.	
Ichthyol.....	s.	sp.	sp.	s.	s.
Iodine.....	5000	10	3	s.	50
Iodoform.....	14000	52	5.2	v. s.	
Iodol.....	5000	3	3	50	
Iron Acetate.....	4	s.			
Albuminate.....	s.	ins.			
Arsenate.....	ins.	ins.			
Bromide.....	s.	s.			
Carbonate, Saccharated.....	sp.	ins.			
Chloride (Ferric).....	v. s.	v. s.	sl.		
Citrate.....	s.	ins.	ins.		
Hypophosphite.....	n. ins.				
Iodide.....	s.				s.
Iodide, Saccharated.....	7	n. ins.			
Lactate.....	40	ins.	ins.		7
Nitrate.....	s.	s.			
Phosphate (Soluble).....	v. s.	ins.			
Pyrophosphate.....	v. s.	ins.			
Sulphate.....	1.8	ins.	ins.		4
Valerianate.....	ins.	v. s.			
and Ammonium Citrate.....	s.	ins.			
Ammonium Tartrate.....	v. s.	ins.			13
Potassium Tartrate.....	v. s.	ins.			
Quinine Citrate.....	2.3	sp.			
Strychnine Citrate.....	s.	sp.			
Lanolin.....	ins.	sp.	s.	s.	
Lard.....	ins.	sl.	v. s.	v. s.	
Lead Acetate.....	2.3	21	ins.	3	5
Carbonate.....	ins.	ins.			
Chloride.....	140	200			
Chromate.....	ins.				
Iodide.....	2000	sp.	n. ins.		
Nitrate.....	2	n. ins.			
Oxide.....	n. ins.	ins.			
Sulphate.....	n. ins.	ins.			
Lime.....	750	ins.			65
Chlorinated.....	sp.	sp.			
Sulphurated.....	sl.	ins.			20
Lithium Benzoate.....	3	10			
Bromide.....	0.6	v. s.	s.		
Carbonate.....	80	ins.	ins.		
Citrate.....	2	n. ins.	ins.		s.
Iodide.....	0.6				
Salicylate.....	v. s.	v. s.			
Magnesia.....	n. ins.	ins.			
Magnesium Acetate.....	s.	s.			
Benzoate.....	v. s.				
Bromide.....	v. s.	s.			
Carbonate.....	n. ins.	ins.			
Phosphate.....	350	ins.			



TABLE OF SOLUBILITIES—(Continued).

MEDICINAL SUBSTANCES. One part is soluble in [at 59° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Magnesium Sulphate.....	1.5	ins.	ins.	.....	.....
Tartrate.....	322	.....	.....	.....	.....
Manganese Dioxide.....	ins.	ins.	ins.	.....	.....
Hypophosphite.....	v. s.	.....	.....	.....	.....
Sulphate.....	0.8	ins.	ins.	.....	.....
Menthol.....	sl.	v. s.	v. s.	v. s.	.....
Mercury Chloride, Ammoniated...	ins.	ins.	.....	.....	.....
Corrosive.....	16	3	4	.....	14
Mild.....	ins.	ins.	ins.	.....	.....
Cyanide.....	12.8	15	sp.	.....	4
Iodide, Yellow.....	n. ins.	ins.	ins.	.....	.....
Red.....	n. ins.	130	ins.	s.	3.5
Oxide, Yellow.....	ins.	ins.	.....	.....	.....
Red.....	ins.	ins.	.....	.....	.....
Salicylate.....	ins.	ins.	.....	.....	.....
Sulphate, Basic.....	2000	ins.	.....	.....	.....
Morphine.....	4350	300	4000	160	210
Acetate.....	2.5	47.6	1700	2100	5
Hydrobromide.....	25	.....	.....	.....	20
Hydrochloride.....	24	62	sl.	sl.	5
Lactate.....	8	93	.....	.....	.....
Meconate.....	25	v. s.	.....	.....	.....
Sulphate.....	21	702	n. ins.	.....	5
Tartrate.....	10	v. s.	.....	.....	.....
Naphthalin.....	ins.	15	v. s.	v. s.	.....
Naphthol (Beta).....	1000	0.75	v. s.	v. s.	.....
Narcotine.....	n. ins.	80	35	3	.....
Nicotine.....	v. s.	v. s.	s.	s.	.....
Nitroglycerin.....	n. ins.	v. s.	s.	.....	.....
Pancreatin.....	s.	ins.	.....	.....	.....
Paraffin.....	ins.	ins.	s.	s.	.....
Paraldehyde.....	8.5	a.	a.	.....	.....
Pelletierine.....	v. s.	v. s.	v. s.	v. s.	.....
Tannate.....	700	80	.....	.....	.....
Pepsin.....	100	ins.	ins.	ins.	.....
Petrolatum.....	ins.	ins.	s.	s.	.....
Phenacetin.....	sp.	16	.....	.....	s.
Phenocoll Hydrochloride.....	16	.....	.....	.....	.....
Phosphorus.....	ins.	s.	80	v. s.	500
Physostigmine.....	sp.	v. s.	v. s.	s.	.....
Salicylate.....	150	12	.....	.....	.....
Sulphate.....	v. s.	v. s.	.....	.....	.....
Picrotoxin.....	240	9	sl.	sl.	.....
Pilocarpine.....	s.	v. s.	s.	s.	.....
Hydrochloride.....	v. s.	v. s.	n. ins.	n. ins.	.....
Hydrobromide.....	s.	s.	.....	s.	.....
Piperazin.....	v. s.	.....	.....	.....	.....
Piperin.....	n. ins.	30	sl.	s.	.....
Podophyllin.....	n. ins.	s.	sp.	.....	.....
Potassa, Sulphurated.....	2	sp.	.....	.....	.....
Potassium Acetate.....	0.36	1.9	ins.	.....	.....
Arsenate.....	v. s.	25	.....	.....	2
Arsenite.....	v. s.	sp.	.....	.....	.....
Benzoate.....	v. s.	.....	.....	.....	.....
Bicarbonate.....	3.2	n. ins.	ins.	.....	.....
Bichromate.....	10	ins.	ins.	.....	.....
Bitartrate.....	201	sp.	ins.	.....	.....
Bromide.....	1.6	200	ins.	.....	4
Carbonate.....	1.1	ins.	ins.	.....	.....
Chlorate.....	16.7	sp.	ins.	.....	30
Chloride.....	3	s.	ins.	.....	30
Citrate.....	0.6	sp.	.....	.....	.....
Cyanide.....	2	sp.	sp.	.....	3.5
Ferricyanide.....	4	sp.	.....	.....	.....
Ferrocyanide.....	4	ins.	.....	.....	.....
Hydrate.....	0.5	2	sl.	.....	.....

TABLE OF SOLUBILITIES—(Continued).

MEDICINAL SUBSTANCES. One part is soluble in [at 59° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Potassium Hypophosphite.....	0.6	7.3	ins.		
Iodide.....	0.75	18	ins.		
Nitrate.....	3.8	sp.	ins.		
Nitrite.....	v. s.				
Permanganate.....	16	dec.	ins.		
Phosphate.....	s.				
Salicylate.....	s.	s.	ins.		
Sulphate.....	9.5	ins.	ins.		
Tartrate.....	1	ins.	ins.		
and Sodium Tartrate.....	1.4	n. ins.	ins.		
Pyoktannin.....	75	12	ins.	s.	50
Pyridine.....	a.	v. s.	v. s.		
Pyrogallol.....	1.7	1	1.2		
Quinidine.....	2000	20	30		
Hydrochloride.....	27	v. s.	ins.		
Sulphate.....	100	8	n. ins.	14	
Quinine.....	1670	6	23	5	200
Acetate.....	600	7			
Arsenate.....	sp.				
Arsenite.....	sp.	15	25	8	
Benzoate.....	350				
Bisulphate.....	10	32	ins.		
Hydrobromide.....	54	0.6	6	12	s.
Hydrochloride.....	34	3	ins.	9	
Hypophosphite.....	45	10			
Lactate.....	3	s.			
Phosphate.....	700	sl.			
Salicylate.....	225	20	120	v. s.	
Sulphate.....	740	65	sl.	680	40
Tannate.....	n. ins.	sl.			135
Valerianate.....	100	5	s.		
Resin.....	ins.	s.	s.	s.	
Resorcin.....	0.6	0.5	v. s.	sl.	v. s.
Saccharin.....	230	30	0.3		s.
Salicin.....	28	30	n. ins.	n. ins.	
Salol.....	n. ins.	10	0.3	v. s.	
Sanguinarine.....	ins.	v. s.	v. s.	s.	
Nitrate.....	n. ins.				
Santonin.....	5000	40	140	4	
Silver Acetate.....	100	sp.			
Bromide.....	ins.				
Chloride.....	ins.				
Cyanide.....	ins.	ins.			
Iodide.....	ins.	ins.			
Nitrate.....	0.6	26			
Oxide.....	n. ins.	ins.			
Sulphate.....	200				
Sodium Acetate.....	1.4	30	ins.		
Arsenate.....	4	sp.			2
Arsenite.....	s.	sp.			
Benzoate.....	1.8	45	ins.		
Bicarbonate.....	14	ins.	ins.		13
Bisulphite.....	4	72			
Borate.....	16	ins.	ins.		2
Bromide.....	1.2	13	ins.		
Carbonate.....	1.6	ins.	ins.		1.02
Chlorate.....	1.1	100			5
Chloride.....	2.8	n. ins.	ins.	ins.	5
Citrate.....	v. s.				
Hydrate.....	1.7	v. s.			
Hypophosphite.....	1	30	ins.		
Hyposulphite.....	0.65	ins.			
Iodide.....	0.6	3	ins.		
Lactate.....	v. s.	v. s.	ins.		
Nitrate.....	1.3	100	ins.		
Nitrite.....	1.5	sl.			

TABLE OF SOLUBILITIES—(Continued).


MEDICINAL SUBSTANCES. One part is soluble in [at 59° F. (15° C.) U. S. P. Standard Temperature]	Parts of				
	Water.	Alcohol.	Ether.	Chloroform.	Glycerin.
Sodium Phosphate .....	5.8	ins.	ins.		
Pyrophosphate .....	12	ins.			
Salicylate .....	0.9	6	ins.		s.
Santoninate .....	3	12	ins.		
Sulphate .....	2.8	ins.	ins.		s.
Sulphite .....	4	sp.			
Sulphocarbonate .....	4.8	132			
Tartrate .....	5	ins.			
Valerianate .....	v. s.	s.			
Sparteine .....	sp.	v. s.	v. s.	v. s.	
Sulphate .....	v. s.	v. s.			
Spermaceti .....	ins.	n. ins.	s.	s.	
Strontium Bromide .....	1.05	s.			
Iodide .....	0.6	s.	sl.		
Lactate .....	4	s.			
Nitrate .....	5	ins.			
Sulphate .....	sl.	ins.			
Strophanthin .....	s.	s.	ins.		
Strychnine .....	6700	110	ins.	7	400
Acetate .....	75			15	
Hydrobromide .....	32	sp.			
Hydrochloride .....	50				
Nitrate .....	75	100	ins.		30
Sulphate .....	50	109	ins.		5
Sugar, Cane .....	0.5	175	ins.	ins.	s.
Milk .....	6	ins.	ins.	ins.	
Sulphonal .....	500	65	125		
Sulphur, Precipitated .....	ins.	ins.	s.	s.	
Terebene .....	sl.	s.			
Terpin Hydrate .....	250	10	10	200	
Tetronal .....	sl.	v. s.	s.		
Thalline Sulphate .....	7	100	sl.	sl.	
Tartrate .....	10	sp.	n. ins.		
Trional .....	320	v. s.	v. s.		
Thymol .....	1200	1	0.8	0.7	120
Urethane .....	s.	s.	s.		
Vanillin .....	sp.	s.	s.	s.	
Veratrine .....	sl.	3	6	2	s.
Hydrochloride .....	v. s.	v. s.			
Wax, Yellow .....	ins.	sp.	v. s.	v. s.	
Zinc Acetate .....	2.7	36	ins.		
Bromide .....	v. s.	v. s.			
Carbonate, Precipitated .....	ins.	ins.			
Chloride .....	0.3	v. s.	s.		2
Cyanide .....	ins.	ins.			
Iodide .....	v. s.	v. s.	v. s.		2.5
Lactate .....	60	ins.			
Oxide .....	ins.	ins.			
Permanganate .....	v. s.	v. s.			dec.
Phosphate .....	ins.	ins.			
Phosphide .....	ins.	ins.			
Salicylate .....	25	3.5	36		
Sulphate .....	0.6	ins.	ins.		3
Tannate .....	ins.	ins.			
Valerianate .....	100	40	n. ins.		

## TABLE OF PRICES.

AVERAGE OF PRICES CHARGED IN THE VARIOUS SECTIONS OF THE UNITED STATES FOR PRESCRIPTIONS NOT REQUIRING EXTRAORDINARY SKILL OR CALLING FOR ANY VERY EXPENSIVE INGREDIENT.

LIQUIDS.		POWDERS, CAPSULES, OR PILLS.	
1 ounce,	\$0.20-0.25	1 to 4,	\$0.15-0.25
2 "	0.30-0.35	5 to 6,	0.25-0.30
3 "	0.35-0.40	8,	0.30-0.35
4 "	0.40-0.50	10,	0.35-0.40
6 "	0.60-0.65	12,	0.40
8 "	0.75	24,	0.50-0.75
OINTMENTS.		SUPPOSITORIES.	
$\frac{1}{2}$ ounce,	\$0.25	$\frac{1}{2}$ dozen,	\$0.40-0.50
1 "	\$0.30-0.35	1 "	0.75-1.00
2 "	0.40-0.50		

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“ —aq. hydrogen. diox.—ferri sulph.—pot. bichrom....	314
Glyceritum boroglycerini—aqua.....	316
Hydrarg. chlor. cor.—acid. pyrogal.....	268
“ “ “ —albumin.....	22
“ “ “ —ammon. carb.—pot. iodidum.....	79
“ “ “ —antimon. et pot. tart.....	275
“ “ “ —calc. hypophos.—syr. sarsap. co.....	172
“ “ “ —(too large a dose)—potass. carb.....	298
“ “ “ —glycerin.—syr. calcis.....	99

	NUMBER
Hydrarg. chlor. cor.—liq. ac. arsenosi—strych. sulph.....	19
“ “ “ —liq. calcis—muc. acaciæ.....	72
“ “ “ —liq. calcis.—liq. zinci chlor.....	154
“ “ “ —liq. pot. arsenit.....	58
“ “ “ — “ “ “ —quinin. sulph.....	127
“ “ “ — “ “ “ —quin. sulph.—sod. salicyl.....	233
“ “ “ —pot. chloras—sod. iodidum—ammon. iodid.....	8
“ “ “ —pot. iodid.—elix. cinchon.....	1
“ “ “ —pot. carb.—strych. sulph.....	52
“ “ “ —quinin. sulph.—pot. iodid.—tinct. cinchon.....	227
“ “ “ — “ “ “ —tinct. ferri chlor.....	219
“ “ “ —sp. ammon. arom.....	146
“ “ “ —sod. boras.....	213
“ “ “ —syr. ferri iodid.....	63
“ “ “ —alcohol—iodum—ol. terebinthin.....	341
“ “ “ —antimon. et pot. tart.—sp. ammon. arom.— morph. hydrochlor.....	388
“ “ “ —aq. hydrogen. diox.—morph. sulph.—zinci sul- phocarb.....	389
“ “ “ —liq. pot. arsenitis—syr. ferri iodidi—el. cinchon.....	396
“ “ “ —pot. iodidum—tinct. ferri chlor.—syr. sarsap... ..	356
“ “ “ —spiritus ætheris nitrosi—alcohol.....	292
“ “ “ mite—ac. hydrobrom.....	151
“ “ “ —ac. hydrochlor.....	182
“ “ “ —ammon. carb.....	48
“ “ “ —ammon. chlor.....	130
“ “ “ —liquor calcis.....	98
“ “ “ —pepsinum—sodii bromidum.....	329
“ “ “ —antipyrin.—sod. bicarb.....	53
“ “ “ —aq. laurocerasi.....	192
“ “ “ —cocain. hydrochlor.....	136
“ “ “ —iodoform.....	315
“ “ “ —pilocarpin. hydrochlor.....	197
“ “ “ —pot. bromid.....	108
“ “ “ —pot. chloras.....	3
“ “ “ —pot. cyanid.....	161
“ “ “ —pot. iodid.....	32
“ “ “ —sapo.....	299
“ “ “ —sod. bicarb.....	238
“ “ “ —tinct. iodi.....	207
“ iodidum flavum—potass. iodidum.....	351
“ “ viride—potassii chloras—potassii iodidum.....	253
“ oxid. flav.—iodol.....	112
Hydrargyrum—iodum—ac. tannic.—glycerinum.....	327
“ ammon.—tinct. iodi.....	263
Hydrastinæ sulph.—sod. boras.....	117

	NUMBER
Infus. cinchon.—hydrarg. chlor. cor.—sp. ammon. aromat.....	145
“ digitalis—ammon. carb.—acacia—guaiacolum.....	348
“ humuli—tinct. iodi.....	332
“ salviæ—quinin. sulph.—sp. rosemar.—tinct. canthar.....	204
Iodoform—ac. tannic.....	47
“ —(insol. in syr.).....	222
“ —hydrarg. chlor. nit.....	315
Iodol—hydrarg. oxidi flav.....	112
“ —terpin hydras—syr. Tolu.....	183
Iodum—alc.—ol. terebin.....	76
“ —camphora—ung. hydrarg.....	84
“ —lin. camphor co.....	235
“ —(in ointment).....	305
“ —sp. camphor—lin. sapon.....	29
“ —ac. tannic.—glycerinum—hydrargyrum.....	327
“ —alcohol—hydrarg. chlor. cor.—ol. terebinthin.....	341
“ —oleatum hydrargyri.....	337
Liniment. ammoniæ—tinct. iodi—tinct. aconiti.....	255
“ calcis—unguent. hydrarg. nitrat.....	199
“ camphor. co.—iodum.....	235
“ saponis—iodum—sp. camphor.....	29
“ “ —aq. ammon.—tinct. iodi.....	122
Liquor acidi arsenosi—hydrarg. chlor. cor.—strych. sulph.....	19
“ ammon. acet.—tinct. ferri chlor.....	201
“ “ —ol. gaulther.—sod. salicyl.—tinct. ferri chlor.....	225
“ “ —sp. ætheris nitrosi.....	374
“ arsenic—auri et sod. chlor.....	103
“ arseni et hydrarg. iodidi—quinin. sulph.....	17
“ bismuthi—vini pepsini.....	135
“ calcis—ol. morrhua—syr. ferri iodidi.....	16
“ “ —muc. acaciæ—hydrarg. chlor. cor.....	72
“ “ —bis. subnit.—ac. carbolicum.....	363
“ “ —hydrargyri chlor. mite.....	98
“ “ —hydrarg. chlor. cor.—liq. zinci chlor.....	154
“ “ —petrolat.—zinci carbon.—zinci oxidum.....	205
“ “ —sp. ammon. aromat.....	228
“ “ —liq. plumbi subacet.—glycerin.....	278
“ “ —ac. tannic.....	291
“ “ —ac. salicyl.....	312
“ ferri chlor.—pot. chloras—glycerin.....	44
“ “ dialys.—liq. pot. arsenit.....	56
“ “ “ —“ “ —tinct. cinchon.....	60
“ “ “ —mucil. acaciæ.....	129
“ “ “ —tr. lav. co.—tr. cinchon. co.—bis. subnit.....	383
“ “ et ammon. acet.—quinin. sulph.....	116

	NUMBER
Liquor ferri et ammon. acet.—sp. ætheris nitrosi—caffaina citrata.....	372
“ “ subsulph.—acidum carbolicum—glycerinum.....	380
“ hydrarg. chlor.—sp. ammon. aromat.....	177
“ “ —syr. acidi hydriodici.....	294
“ iodi co.—liq. potassæ—ol. olivæ.....	266
“ morphinæ hydrochlor.—pot. chloras.....	293
“ “ hypodermicus—pot. iodidum.....	359
“ plumbi subacet.—tinct. opii.....	137
“ “ —mucil. acaciæ.....	169
“ “ —glycerin.—liq. calcis.....	278
“ potassæ—liq. iodi co.—ol. olivæ.....	266
“ potassii arsenitis—ac. phosphor.—tinct. ferri chlor.—quinin. sulph.....	27
“ potassii arsenitis—liq. ferri dialys.....	56
“ “ —hydrarg. chlor. cor.....	58
“ “ —liq. ferri dialys.—strych. hydrochlor.....	60
“ “ —liq. strych.....	77
“ “ —hydrarg. chlor. cor.—quinin. sulph.....	127
“ “ —tinct. nucis vom.....	168
“ “ —strych. nitras.....	202
“ “ —syr. ferri iodidi.....	214
“ “ —hydrarg. chlor. cor.—sod. salicyl.....	233
“ “ —argenti nitras.....	252
“ “ —hydrarg. chlor. cor.—syr. ferri iodidi—el. cinchon.....	396
“ “ —potassii iodidum.....	65
“ “ —pot. iodidum—strych. sulph.....	369
“ “ —strych. sulph.—fer. et quin. cit.—aq. cinnam.....	362
“ “ —tinct. iodi.....	328
“ saccharini—liq. strych. hydrochlor.....	330
“ sodæ chloratæ—ammon.—thymol.....	193
“ “ —aq. carbol.—aq. ammon.....	236
“ sodii arsenatis—ac. sulphur.—pot. iodidum—quinin. sulph.....	300
“ “ —syr. ferri iodidi.....	390
“ strych.—sod. bicarb.....	57
“ “ —liq. pot. arsenit.....	77
“ “ —potassii iodidum.....	175
“ “ hydrochlor.—liq. saccharini.....	330
“ zinci chlor.—hydrarg. chlor. cor.—liq. calcis.....	154
Lithii bromidum—sodii phosphas—sodii chloridum.....	286
“ salicylas—ferri et ammon. cit.....	175
Magnesia—aqua.....	149
Magnes. carb.—ac. citrici—sod. boras.....	86
“ sulph.—calc. hypophos.—ferri sulph.....	95
“ “ —ext. valerian. fl.—ext. tarax. fl.—tinct. gent. co.....	133

	NUMBER
Massa ferri carb.—ac. sulph. aromat.....	246
Mel—sod. bicarb.—sod. boras.....	234
Menthol—thymol—ac. benzoic. ac. salicyl.—sod. bicarb.....	114
“ — “ —eucalyptol—guaiacol carb.....	248
“ —(insolubility in water) .....	185
“ —chloroformum—tinct. benzoini—petrolatum liquidum ....	400
Morphinæ acet—pot. cyanid.....	49
“ “ —ac. tannic.—tinct. myrrhæ.....	78
“ “ —sp. æther nit.—liq. ammon. acet.....	81
“ “ ferri sulph.—potass. iodidum.....	106
“ hydrochlor.—ammon. chlor.—codeina.....	276
“ “ —hydrarg. chlor. cor.—sp. ammon. arom.— antim. et pot. tart.....	388
“ sulph.—atrop. sulph.....	88
“ “ —pot. chloras—tinct. ferri chlor.....	104
“ “ —bis. subnit.—sod. bicarb.....	111
“ “ —sp. æther. nit.....	126
“ “ —(large dose).....	157
“ “ —cupri sulph.—zinci sulph.....	188
“ “ —æther chloroform.....	208
“ “ —sod. bicarb.—tinct. ferri chlor.....	221
“ “ —antikamnia—elixir aromat.....	352
“ “ —aq. hydrogen. diox.—hydrarg. chlor. cor.—zinci sulphocarb ..	389
“ “ —chloroformum—sp. ammon. aromat.—aq camphoræ	340
“ “ —pot. citras—sp. ætheris nitrosi—tinct. aconiti.....	378
Mucilago acaciæ—potass. permanganas.....	5
“ “ —tinct. guaiaci.....	6
“ “ —tinct. ferri chlor.—sp. æther. nit.....	50
“ “ — “ “ “ —liq. ammon. acet.....	71
“ “ —hydrarg. chlor. cor.—liq. calcis.....	72
“ “ —liq. ferri dialys.....	129
“ “ —liq. plumbi subacet .....	169
“ “ —sod. boras.....	190
“ “ —ol. morrhuæ—sod. boras—syr. tolu.....	272
“ “ —alc. ....	174
Naphtol—exalgin.....	269
Oleatum hydrarg.—iodum.....	337
Oleum cubebæ—ol. santali—copaiba—sp. æth. nitrosi.....	335
“ gaultheriæ—tinct. ferri chlor.....	225
“ lini—ac. sulphur.—plumbi acet.—pot. nitras.....	220
“ morrhuæ—syr. ferri iodidi—liq. calcis.....	16
“ “ —acacia—sod. boras—syr. Tolu.....	272
“ olivæ—atrop. sulph.....	242

	NUMBER
Oleum olivæ—liq. iodi co.—liq. pot.....	266
“ ricini—glycerin .....	254
“ sabinæ—(in pills).....	232
“ santali—ol. cubebæ—copaiba—sp. æther. nitrosi.....	335
“ terebinthinæ—syrup.....	37
“ “ —alc.—iodum.....	76
“ “ —ac. nitric.—ac. sulphuric.....	90
“ “ —hydrarg. chlor. cor.—iodum—alcohol.....	341
“ “ —tinct. iodi .....	354
“ “ —ac. nitrohydrochlor.....	143
“ “ —ext. can. ind. fl.—syr. zingib.....	166
“ “ —santonin.—syrupus.....	186
“ tigllii—glycerin.....	270
Opium—argenti nitras.....	368
Pepsinum—bis. et ammon. cit.—ac. hydrochlor.....	30
“ —hydrarg. chlor. mite—sodii bromidum.....	329
“ —sodii bicarbonas—sodii bromidum.....	74
Petrolatum—bals. Peru.....	64
“ —liq. calcis.....	205
“ —ac. carbol.—sp. myrciæ .....	224
“ —glycerin .....	303
“ —ac. gallicum—cocainæ hydrochlor.—ung. zinci oxidi....	216
“ —boroglycerinum.....	331
“ —liquidum—chloroformum—menthol—tinct. benzoini....	400
Phenacetinum—ac. salicyl.—exalgin.....	148
“ —camphora—exalgin—salol.....	226
“ —tinct. ferri chlor.....	290
“ —(insoluble in water).....	307
“ —chloral—quinin. sulph.....	310
“ —syrupus.....	398
Phenocol. hydrochlor.—piperazin.....	155
Phosphorus—strych. sulph.—ferri phosphas sol.—det. el. cinchon....	386
Picis liq.—ac. sulph.—pot. bichromas.....	198
Pilocarpina—hydrarg. chlor. mit .....	197
Piperazin.—(in powder).....	215
“ —phenocoll hydrochlor.....	155
“ —strych. sulph.—aq. chloroformi.....	343
Plumbi acetas—quinin. sulph.—bis. subnit.....	13
“ “ —alum.....	14
“ “ —zinci sulph.....	109
“ “ —ac. tannic.—alum—zinci sulph.....	147
“ “ —ac. carbolic—thymol.....	217
“ “ —“ “ —ac. sulphur.—ol. lini.....	220
“ “ —ammon. carb.....	231
“ “ —glycerin.—sod. boras.....	259

	NUMBER
Plumbi acetat—ac. pyrogallic.....	271
“ “ —ac. carbol.—camphora—tinct. iodi.....	288
“ subacet.—bis. subnit.—sodii bicarb.....	111
“ “ —zinci sulph.—tinct. catechu co.—tinct. opii.....	21
Podophyllin—quinin. sulph.—tinct. ferri chlor.—tinct. rhei.....	287
Potass. acet.—quinin. sulph.....	59
“ “ —(in powders).....	280
“ “ —sp. æther. nitrosi.....	350
“ bicarbon.—ext. buchu fl.—sp. æther. nit.....	51
“ “ —ac. sulphuric.—quinin. sulph.....	142
“ “ —syr. ferri iodidi.....	322
“ bichromas—ac. sulph.—picis liquid.....	198
“ “ —aq. hydrogen. diox.—ferri sulph.—glycerin.....	314
“ bromid.—chloral—elixir.....	20
“ “ —hydrarg. chlor. mit.....	108
“ “ —aq. camphor.....	162
“ “ —strych. sulph.....	180
“ “ —chloral—ext. can. indicæ—ext. hyoscyami—aqua.....	237
“ “ —pot. iodidum—quin. sulph.—ac. sulph. dil.....	375
“ carbonas—hydrarg. chlor. cor.—strych. sulph.....	52
“ “ —massa ferri carbon.—ac. arsenosi.....	187
“ chloras—hydrarg. chlor. mit.....	3
“ “ —ammon. iodid.—hydrarg. chlor. cor.....	8
“ “ —sod. hypophosphis.....	9
“ “ —antimon. sulphur.—saccharum—sulphur.....	36
“ “ —aq. menth. pip.—tinct. myrrh.—ac. carbol.....	39
“ “ —glycerin.—liq. ferri. chlor.....	44
“ “ —ac. hydrochlor.....	45
“ “ —tinct. ferri chlor.—ext. glycyrrh. fl.—glycerin.....	68
“ “ —syr. ferri iodid.—vin. antimon.....	80
“ “ —carbo ligni—cinchona—potass. salicyl.....	82
“ “ —calc. hypophos.—ferri lactas.....	83
“ “ — “ “ —ferri sulph.—mag. sulph.....	95
“ “ —morph. sulph.—tinct. ferri chlor.....	104
“ “ —quinin. sulph.—sod. hyposulph.—tinct. ferri chlor....	150
“ “ —catechu.....	184
“ “ —ac. sulphuros.—glycerin.—tinct. ferri chlor.....	211
“ “ —ac. sulphuros.....	261
“ “ —liq. morph. hydrochlor.....	292
“ “ —ac. sulphuric.—syr. ferri iodidi.....	306
“ “ —ac. carbolic—tinct. ferri chloridi.....	336
“ “ —potas. iodidum—hydrarg. iodidum viride.....	253
“ “ —saccharum.....	355
“ “ —spir. æther. nit.—pot. citras—ac. camphoræ.....	338
“ “ —syrupus ferri iodidi.....	358
“ citras—sp. æther. nit.....	145



	NUMBER
Potass. citras—acid. citric.—quinin. sulph.....	196
“ “ (in powders).....	379
“ “ —morph. sulph.—sp. æther. nitrosi—tinct. aconiti.....	378
“ cyanid.—morph. acet.....	49
“ “ —hydrarg. chlor. mite.....	161
“ “ —chloral.....	203
“ “ —strych. sulph.....	273
“ et sod. tart.—ac. sulph. arom.....	163
“ hypophos.—ac. lactic.—ferri lactas—el. gent. et fer. chlor. ...	361
“ Iodidum—hydrarg. chlor. cor.—elix. cinchon.....	1
“ “ —sp. æther. nit.....	26
“ “ —hydrarg. chlor. mit.....	32
“ “ —quinin. sulph.—strych. sulph.....	34
“ “ —codeina.....	38
“ “ —sp. æther. nit.—tinct. ferri chlor.....	55
“ “ —ammon. carb.—hydrarg. chlor. cor.....	79
“ “ —ferri sulph.—morph. acet.....	106
“ “ —quinin. sulph.—ac. nitrohydrochlor.....	115
“ “ —quinin. sulph.—ac. tartaric.....	119
“ “ —amyl. nitris.....	132
“ “ —ferri et quinin. cit.....	179
“ “ —hydrarg. chlor. cor.—quinin. sulph.....	227
“ “ —ac. citric.—quinin. sulph.....	289
“ “ —ac. sulph.—liq. sod. arsenat.—quinin. sulph.....	300
“ “ —argenti nitras—glycerinum.....	339
“ “ —hydrarg. chlor. cor.—tinct. fer. chlor.—syr. sarsap..	356
“ “ —hydrarg. iodidum flavum.....	351
“ “ —hydrarg. iodidum viride—potas. chloras.....	253
“ “ —liq. morph. hypodermicus.....	359
“ “ —liq. potassii arsenitis.....	65
“ “ —liq. pot. arsenit.—strych. sulph.....	369
“ “ —liquor strychninæ.....	175
“ “ —pot. bromidum—quin. sulph.—ac. sulph. dil.....	375
“ “ —(in pills).....	304
“ “ —ferri et potass. tart.—acid. sulphuric.....	325
“ nitras—sod. chlor.—aqua—alc.—tinct. opii.....	212
“ “ —plumbi acet.—ac. sulphur.—ol. lini.....	220
“ nitris—ext. nucis vom. fl.—ext. digitalis fl.—tinct. strophan ...	334
“ permanganas—mucil. acaciæ.....	5
“ “ —ext. glycyrrhiz.—glyc. amyli.....	89
“ “ —glycerin.....	144
“ “ —aq. hydrogen. diox.....	191
“ “ —argent. nitras.....	247
“ “ —ac. carbolic.....	258
“ “ —ac. salicylic.—ferri sulph.....	281
“ “ —ferrum reduct.—quinin. sulph.....	283



Quinin. sulph.—ac. sulphuric.—ferri et pot. tart.....	323
Resorcinum—sp. æther. nit.....	120
“ —acetanilid.—antipyrin .....	240
Rheum—tinct. ferri chlor.....	27
Saccharum—pot. chloras.....	36, 355
Salol—thymol.....	125
“ —acetanilid.—camphor. monobrom.....	153
“ —tinct. ferri chlor.....	264
“ —camphor—exalgin—phenacetin.....	226
“ —trional—hydrarg. chlor. mite.....	346
Santonin—(too large a dose).....	173
“ —ol. terebin.—syrup.....	186
Sapo.—hydrarg. chlor. mite.....	299
Sodii arsenas—(too large a dose).....	298
“ benzoas—quinin. sulph.—elix.....	218
“ bicarbonas—antipyrin.—hydrarg. chlor. mit.....	53
“ “ —liq. strych.....	57
“ “ —acid. salicyl.....	91
“ “ —bis. subnit.....	107
“ “ — “ “ —morph. sulph.—plumbi subacet.....	111
“ “ —ac. benzoic.—ac. salicyl.....	114
“ “ —sod. boras.—glycerin.....	141
“ “ —ac. hydrocyanic.....	152
“ “ —quinin. sulph.—morph. sulph.—tinct. ferri chlor. .	221
“ “ —mel—sod. boras.....	234
“ “ —hydrarg. chlor. cor.....	238
“ “ —(insolubility in chloroform).....	239
“ “ —pepsinum—sodii bromidum.....	74
“ boras—zinci sulph.....	25
“ “ —chloral.....	43
“ “ —ac. citric.—mag. carb.....	86
“ “ —ac. salicyl.—ac. benzoic. glycerin.....	114
“ “ —hydrastin. sulph.....	117
“ “ —sod. bicarb.—glycerin.....	141
“ “ —cocain. hydrochlor.....	176
“ “ —mucil. acaciæ.....	190
“ “ —hydrarg. chlor. cor.....	213
“ “ —ac. benzoicum—syrupus.....	357
“ “ —acid. salicyl.—atropina sulph.—strych. sulph.....	377
“ “ —alumen—glycerinum.....	382
“ “ —aqua—tinct. myrrhæ.....	360
“ “ —zinci sulphas.....	10
“ “ —mel—sod. bicarbon.....	234
“ “ —glycerin.—plumbi. acet.....	259

	NUMBER
Sodii boras—acacia—ol. morrhua—syr. tolu.....	272
“ bromidum—antipyrinum—camphoræ—caffeina cit.....	347
“ “ —antipyrinum—caffeina—aq. cinnam.—syr. limonis...	371
“ “ —chloral—antipyrinum—syr. limonis.....	342
“ “ —hydrarg. chlor. mite—pepsinum.....	329
“ “ —pepsinum—sodii bicarbonatis.....	74
“ chlorid.—argent. nitras.....	170
“ “ —alc.—aqua.....	212
“ hypophos.—bis. subnitras.....	7
“ “ —potass. chloras.....	9
“ “ —ac. sulphurosi.....	31
“ “ —calc. hypophos.—tinct. ferri chlor.....	181
“ “ —el. gent. et ferri chlor.—ferri lactas—strych. lactas..	361
“ hyposulphis—potass. chloras—tinct. ferri chlor.....	150
“ iodid.—hydrarg. chlor. cor.—potass. chloras..	8
“ phosphas—aqua—syrupus.....	23
“ “ —strych. sulph.....	75
“ “ —lithii bromidum—sodii chloridum.....	286
“ salicylas—quinin. sulph.....	18
“ “ —syr. limonis.....	54
“ “ —ammon. carb.—sp. æther. nit.....	96
“ “ —antipyrin.....	114
“ “ —ac. hydrobrom.—quinin. sulph.....	178
“ “ —sp. æther. nit.....	210
“ “ —liq. ammon. acet.—tinct. ferri chlor.....	225
“ “ —hydrarg. chlor. cor.—quinin. sulph.....	233
“ “ —bismuthi subnit.....	309
“ “ —ammonii chloridum—syr. Tolu.....	394
“ “ —quin. sulph.—sp. æth. nitrosi—tinct. podophyl.....	376
“ “ —antipyrinum—caffeina citrata.....	393
“ “ —pot. cit.—pot. iodidum—sulphonat.....	367
“ “ —quin. sulph.—trional.....	395
Spiritus ætheris nitrosi—ext. buchu fl.....	11
“ “ “ —potass. iodid.....	26
“ “ “ —tinct. ferri chlor.—mucil. acaciæ.....	50
“ “ “ —ext. buchu fl.....	51
“ “ “ —potass. iodid.—tinct. ferri chlor.....	55
“ “ “ —morph. acet.—liq. ammon. acet.....	81
“ “ “ —ammon. carb.—sod. salicyl.....	96
“ “ “ —antipyrin.....	118
“ “ “ —resorcin.....	120
“ “ “ —morph. sulph.....	126
“ “ “ —ext. digitalis fl.....	138
“ “ “ —potass. citras—syrup.....	145
“ “ “ —sod. salicyl.....	210
“ “ “ —tinct. colchici—tinct. guiaci.....	244

	NUMBER
Spiritus ætheris nitrosi—diuretin—tinct. ferri chlor.....	319
“ “ “ —acetanilidum .....	131
“ “ “ —caffeina citrata—liq. ferri et ammon. acet....	372
“ “ “ —copaiba—ol. cubebæ—ol. santali.....	335
“ “ “ —ext. digitalis fl.....	366
“ “ “ —ext. epigæa repens fl.—ext. uvæ ursi fl.....	353
“ “ “ —hydrarg. chlor. cor.—alcohol.....	292
“ “ “ —liq. ammonii acetatis.....	374
“ “ “ —potass. acetas.....	350
“ “ “ —pot. chloras—pot. citras—aq. camphoræ.....	338
“ “ “ —sodii salicylas—quin. sulph.—tinct. podophylli.....	376
“ “ “ —tinct. aconiti—morph. sulph.—pot. citras....	378
“ ammon. aromat.—hydrarg. chlor. cor.—infus. cinchon.....	146
“ “ “ —strych. sulph.—elixir.....	165
“ “ “ —hydrarg. chlor. cor.....	177
“ “ “ —liq. calcis.....	228
“ “ “ —zinci acet.—bis. subnit.....	229
“ “ “ —tinct. opii.....	251
“ “ “ —ac. sulph. aromat. quin. sulph.—syr. sarsap.....	385
“ “ “ —aq. camphoræ—chloroformum—morph. sulph.....	340
“ “ “ —bis. subnit.—aqua—ac. carbol.—tinct. capsic.....	370
“ “ “ —hydrarg. chlor. cor.—antimon. et pot. tart.—morph. hydrochlor.....	388
“ camphoræ—iodum—lin. saponis.....	29
“ frumenti—chloroform.....	251
“ myrciæ—ac. carbol.—petrolat.....	224
“ rosemarini—infus. salviæ.....	204
Strychnina—(insolubility in syr.).....	222
“ —(insolubility in glycer.).....	284
Strychninæ hydrochlor—liq. potass. arsenit.....	60
“ nitras.—liq. potass. arsenit.....	202
“ “ —atrop. sulph.—auri et sod. chlor.—ext. cinchon. fl..	381
“ sulph.—auri et sod. chlor.—atrop. sulph.....	87
“ “ —sp. ammon. arom.—elix.....	165
“ “ —potass. bromid.....	180
“ “ —antikamnia .....	250
“ “ —potass. cyanid .....	273
“ “ —liq. ac. arsenosi.—hydrarg. chlor. cor.....	19
“ “ —pot. iodid.....	34
“ “ —potass. carb.—hydrarg. chlor. cor.....	52
“ “ —(too large a dose) .....	69
“ “ —sod. phosphas .....	75
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